JACOBS ENGINEERING GROUP INC.

600 SEVENTEENTH STREET, SUITE 1100N • DENVER, COLORADO 80202
TELEPHONE (303) 595-8855 FAX (303) 595-8857

17 July 1995

Defense Technical Information Center
Camera Station
Alexandria, VA 22304-6145

RE: **Contact No. F41624-94-D-8046-0004**
Delivery Order No. 0004
Interim Remedial Actions
Indian Mountain Long Range Radar Station, Alaska
Final Work Plan Addendum

Dear Sir/Madam:

Please find attached the Final Work Plan and Sampling and Analysis Plan Addendum for the Interim Remedial Actions to be conducted at Indian Mountain Long Range Radar Station, Alaska. This report provides information and design specifications for excavating and constructing a diversion ditch to collect and divert Source Area SS10 groundwater and surface water, constructing a soil containment unit for the investigation derived waste generated during the remedial investigation conducted in 1994, and additional sampling for further characterization of Source Areas SS02, SS09, OT08, SS10, and SS11.

If you should have any questions, please contact me at (303) 595-8855.

Sincerely,
JACOBS ENGINEERING GROUP INC.

Robert S. Henry

Robert S. Henry
Project Manager

cc: Samer Karmi, AFCEE
Patricia Striebich, 611 CES/CEVR
Bob Garland, AFCEE - Anchorage
Sarah Brown, Jacobs
Warner Reeser, Jacobs
Document Control

United States Air Force
611 Air Support Group
611 Civil Engineer Squadron

Elmendorf AFB, Alaska

FINAL

Indian Mountain LRRS, Alaska

WORK PLAN AND SAMPLING AND ANALYSIS PLAN FOR INTERIM REMEDIAL ACTIONS

Addendum to: RI/FS Work Plan (July 1994)
and Sampling and Analysis Plan (July 1994)

JULY 1995

United States Air Force
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WORK PLAN AND SAMPLING AND ANALYSIS PLAN FOR INTERIM REMEDIAL ACTIONS

Addendum to: RI/FS Work Plan (July 1994) and
Sampling And Analysis Plan (July 1994)

JULY 1995

By:

JE®
JACOBS ENGINEERING GROUP INC.
600 17th Street, Suite 1100N
Denver, CO 80202

PREFACE

This Work Plan Addendum and Sampling and Analysis Plan for Interim Remedial Actions describes the requirements for the expected tasks and activities to construct a diversion ditch, construct a contaminated soil containment cell, and conduct additional sampling in support of remedial investigations at the Indian Mountain Long Range Radar Station, Alaska. This work is performed in accordance with the requirements of Contact No. F41624-94-D-8046, Delivery Order No. 4, between the U.S. Air Force and Jacobs Engineering Group Inc.

The Jacobs Engineering Group Inc. Project Manager for this delivery order is Mr. Robert Henry. Mr. Samer Karmi of the Air Force Center for Environmental Excellence is the Alaska Restoration Team Chief for this task.

Approved:

Warner K. Reeser

Warner K. Reeser
Program Manager
Jacobs Engineering Group Inc.

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This Final Work plan addendum report is provided under Contract No. F41624-94-D-8046, between the U.S. Air Force and Jacobs Engineering Group Inc. The purpose of this report is to describe and detail the activities to be conducted as part of the Interim Remedial Action at Indian Mountain Long Range Radar Station, Alaska. This report contains eight Sections. Section 1.0 provides introduction and background information, and states the objectives for the work. Section 2.0 describes the interim remedial action, including construction specifications. Section 3.0 details the description and construction of the containment cell. Additional characterization of Source Areas SS02, SS10, OT08, SS11 and SS09 is described in Section 4.0. Section 5.0 provides information regarding decontamination and waste management procedures. Sections 6.0, 7.0 and 8.0 provide information on project organization and schedule, reporting, and references, respectively.

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LIST OF ACRONYMS AND ABBREVIATIONS

Air Force	U.S. Air Force
AWQC	Ambient Water Quality Criteria
CFR	Code of Federal Regulations
CO_2	Carbon Dioxide
COR	Contracting Officer Representative
DRMO	Defense Reutilization and Marketing Office
DRO	Diesel-Range Organics
EPA	U.S. Environmental Protection Agency
ft^3	Cubic Feet
GAC	Granular Activated Carbon
gpm	Gallons per Minute
GRO	Gasoline-Range Organics
HDPE	High Density Polyethylene
IDW	Investigation Derived Waste
IMLRRS	Indian Mountain Long Range Radar Station
IRA	Interim Remedial Action
IRP	Installation Restoration Program
Jacobs	Jacobs Engineering Group Inc.
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
Na_2HPO_4	Disodium Phosphate
NH_4Cl	Ammonium Chloride
OSHA	Occupational Safety and Health Administration
O_2	Oxygen
PCBs	Polychlorinated Biphenyls
PCP	Pentachlorophenol
pH	Hydrogen-Ion Activity

LIST OF ACRONYMS AND ABBREVIATIONS

PID	Photoionization Detector
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
SAP	Sampling and Analysis Plan
SVOC	Semivolatile Organic Compound
TCLP	Toxicity Characteristic Leachate Procedure
TPH	Total Petroleum Hydrocarbons
TSCA	Toxic Substances Control Act
UV	Ultraviolet
VOC	Volatile Organic Compound
WAA	Waste Accumulation Area
WACS	White Alice Communications Systems
yd^3	Cubic Yards
° F	Degrees Fahrenheit
μg/L	Micrograms per Liter

1.0 INTRODUCTION

This document describes the approach, methods, and procedures for completing an Interim Remedial Action (IRA) and other activities at the Indian Mountain Long Range Radar Station (IMLRRS) in Alaska. Planned activities include constructing a diversion ditch, constructing a containment cell, and performing additional characterization. This document is an addendum to the Work Plan and Sampling and Analysis Plan (SAP) prepared by the U.S. Air Force (Air Force), dated July 1994 (Air Force 1994a, b).

Based on the results of the Remedial Investigation (RI), performed during July 1994, an IRA and other activities are necessary at IMLRRS. First, construction of a diversion ditch is warranted at OT08, located at Upper Camp. This IRA is necessary to limit the migration of source area SS10 groundwater and surface water contaminants into source area OT08. The interim action at this site consists of a lined diversion ditch. Second, the construction of a containment cell at IMLRRS is required to isolate and treat the investigation derived waste (IDW) created from the July 1994 RI activities. The operation of the cell will also serve as a treatability study to support the selection of future removal actions at IMLRRS to eliminate soil or sediment contamination based on the performance and site-specific results of the containment cell. The third activity includes additional characterization at five source areas including: SS10 and OT08 at Upper Camp, and SS02, SS11, and SS09 at Lower Camp. Additional characterization at source area SS10 will be performed to verify laboratory analytical detections and more accurately define the extent of pentachlorophenol (PCP) in surface water. Laboratory analysis for polychlorinated biphenyls (PCBs) at OT08 will be performed to determine the vertical and horizontal extent of contamination in soil. At source area SS02, surface-soil samples will be collected in order to assess potential risk to human and ecological receptors. Sampling to be performed at SS11 will include test kit and laboratory analysis of surface soils to

characterize the aerial distribution of contamination. Groundwater samples will be collected from monitoring wells and the station water supply well at source area SS09 to provide additional information regarding contaminant concentration and distribution, potential impacts to the water supply well, and contaminant migration.

This Work Plan and SAP addendum is organized in seven sections. The contents of each section are described below:

- Section 1.0 discusses the background, objectives, and organization of this addendum.
- Section 2.0 presents the site characteristics, design considerations, descriptions, construction, and sampling of the diversion ditch.
- Section 3.0 provides a description of the proposed containment cell. The site characteristics, design considerations, construction, and operation and maintenance of the containment cell are described.
- Section 4.0 describes the additional characterization activities to be performed at SS10 to verify and identify PCP-contaminated surface water and at OT08 to determine the vertical extent of PCB-contaminated soil.
- Section 5.0 describes procedures for equipment decontamination and waste management.
- Section 6.0 presents the project organization and the proposed schedule for each of the four addendum activities.
- Section 7.0 identifies the reporting requirements to support the addendum activities.
- Section 8.0 cites all references used to prepare this report.

1.1 BACKGROUND

The IMLRRS consists of 4,270 acres of land located in the interior of the State of Alaska, 168 miles northwest of Fairbanks. The general location of the IMLRRS is shown in Figure 1.1-1; a site plan for Upper Camp is presented in Figure 1.1-2; and a site plan for Lower Camp is illustrated in Figure 1.1-3.

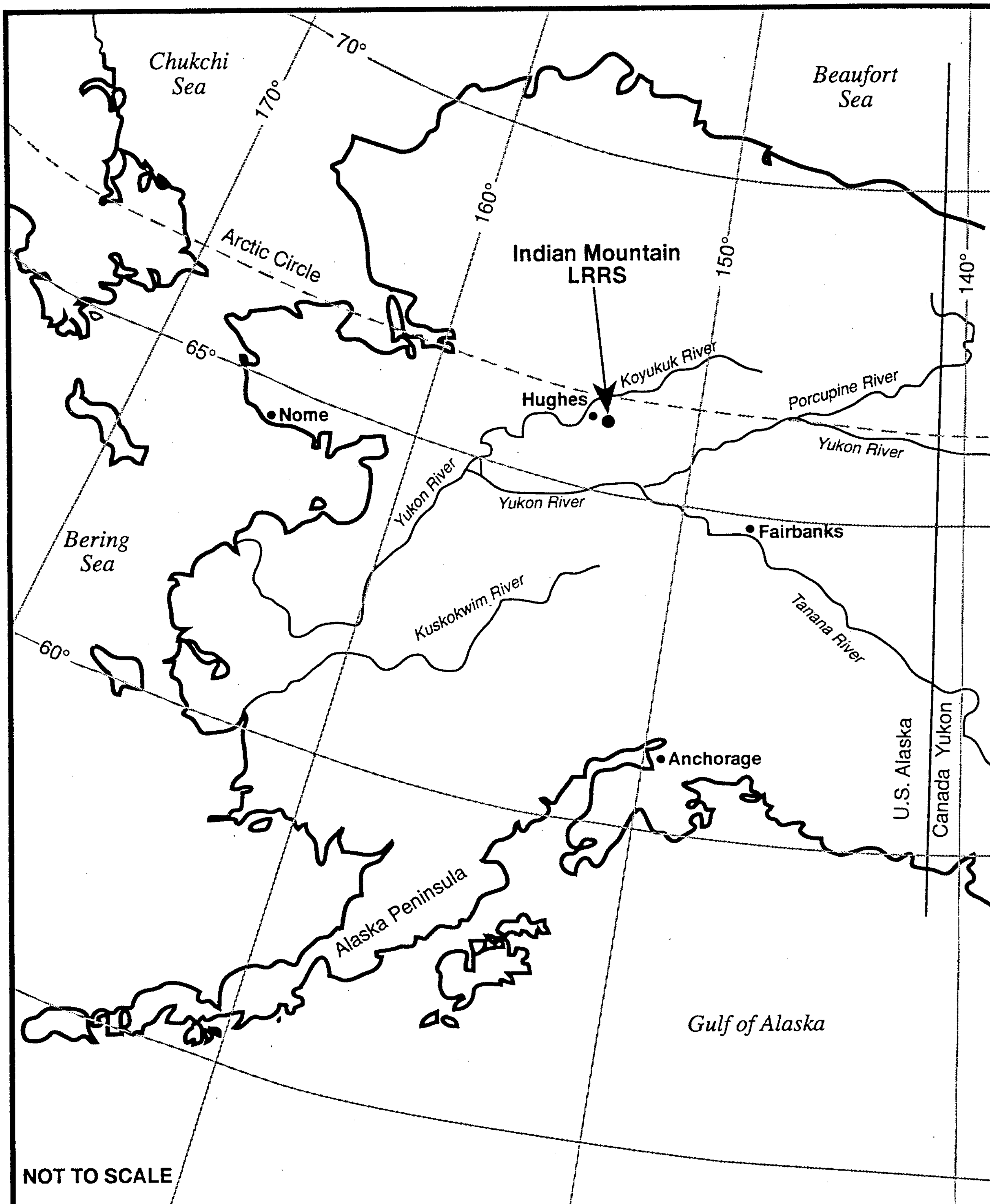


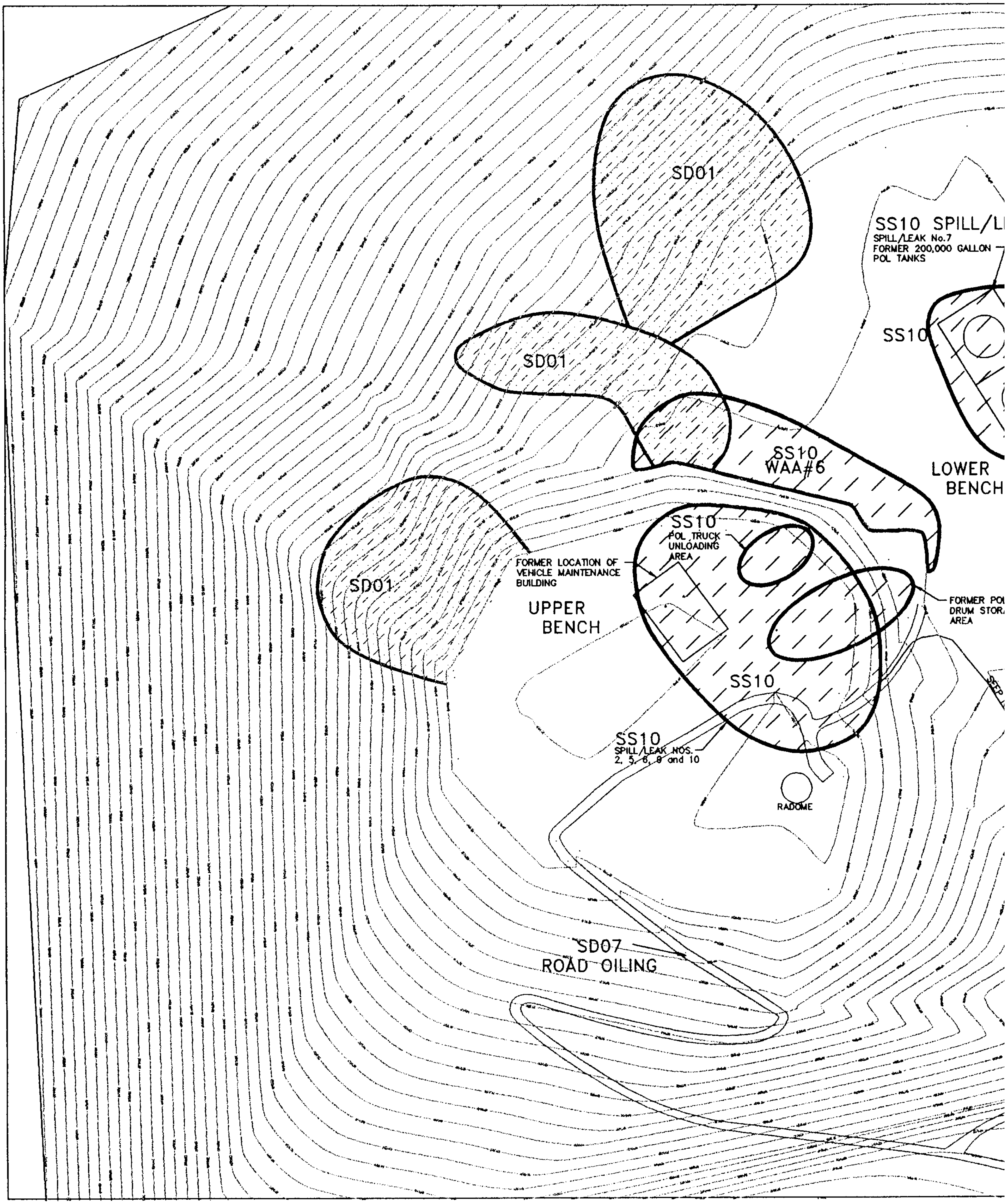
FIGURE 1.1-1
Location Map
Indian Mountain LRRS

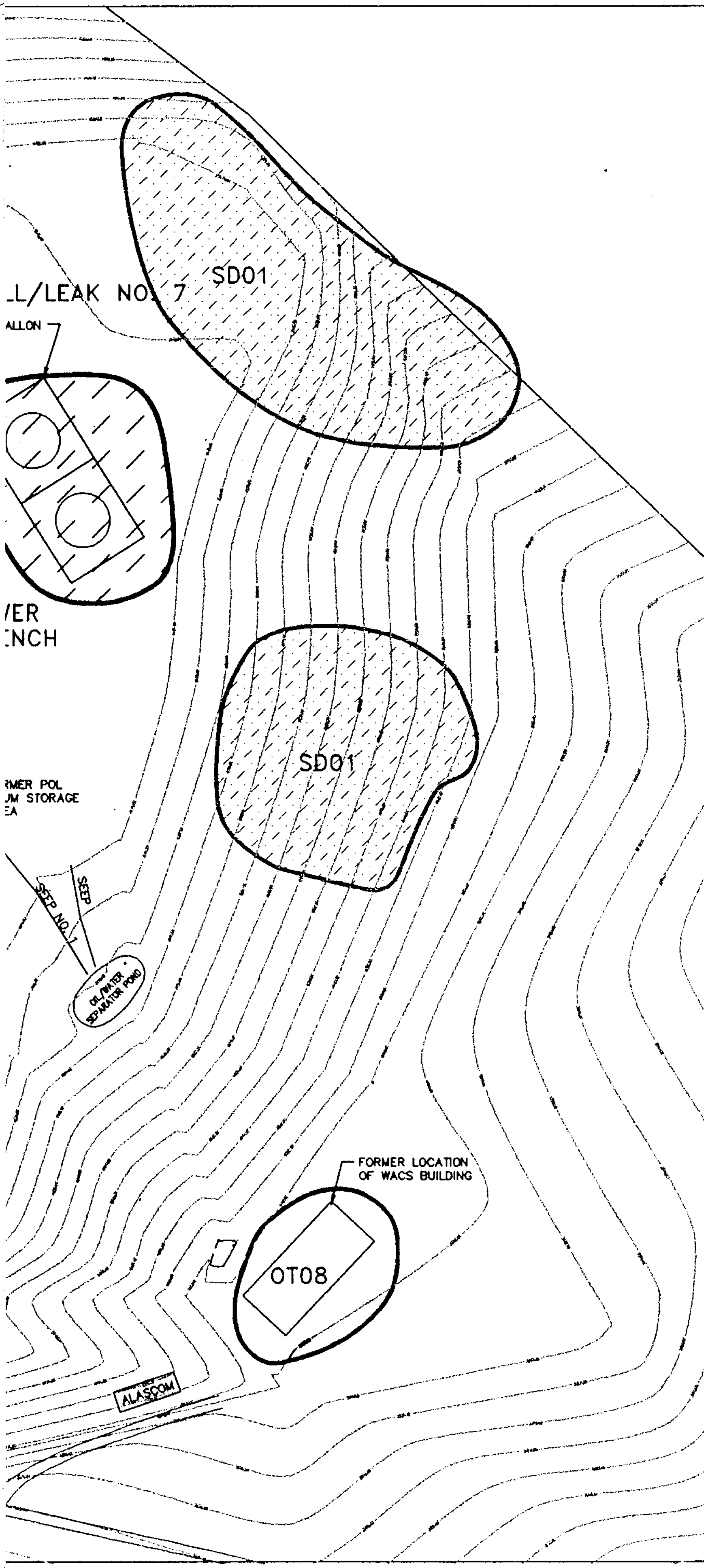
The station is located at approximately 65°59'N latitude and 153°43'W longitude, and is accessible only by air. The station was constructed as two separate camps. Radar equipment is located at Upper Camp and support facilities for all station operations are located at Lower Camp. Upper Camp, at the summit of Indian Mountain (elevation 4,234 feet above mean sea level), is connected to Lower Camp by an unpaved road approximately eight miles in length. Hughes, the nearest community, is about 18 miles northwest of the site. There is no road connecting Hughes and the IMLRRS.

The facility was one of the 31 original White Alice Communications Systems (WACS) built to establish an air defense system in Alaska. IMLRRS was constructed and began operation in 1952. Support facilities at Lower Camp include a landing strip, personnel quarters, and maintenance facilities.

General and installation-specific descriptions of the geology, climate/meteorology, hydrology, biology, demographics, cultural/archaeological resources, and industrial activities of the IMLRRS are presented in the Final Work Plan (Air Force 1994a).

A variety of past activities at the IMLRRS may have resulted in environmental contamination. The Air Force is investigating and may remediate actual and potential sources of contamination through activities conducted under the Installation Restoration Program (IRP). There are 11 source areas at the IMLRRS where IRP investigations have been conducted, eight at Lower Camp and three at Upper Camp. These sites were identified based on the previous IRP investigations (Air Force 1985, 1989, 1990, 1991, and 1993). RI sampling and analysis was conducted at these 11 sites during the summer of 1994 as described in the SAP (Air Force 1994b). These source areas include SD01 (Dump Areas); SS02 (Waste Accumulation Area No. 1); SS03 (Waste Accumulation Area No. 5); LF04 (Landfill No. 1); LF05 (Landfill No. 2); LF06 (Waste Accumulation Area No. 4, Landfill No. 3, and Landfill No. 4); SD07 (Runway/Road Oiling); OT08 (White Alice Communications System); SS09 (Waste Accumulation Area No. 3 and Spill/Leak Nos. 4 and 11); SS10 (Waste Accumulation


SD01
SD01
SD01
SS10 SPILL/LI
SPILL/LEAK No.7
FORMER 200,000 GALLON
POL TANKS
SS10
SS10
WAA#6
LOWER
BENCH
SS10
POL TRUCK
UNLOADING
AREA
FORMER LOCATION OF
VEHICLE MAINTENANCE
BUILDING
UPPER
BENCH
FORMER POL
DRUM STORA
AREA
SS10
SS10
SPILL/LEAK NOS.
2, 5, 6, 8 and 10
RADOME
SD07
ROAD OILING



N
MAG. NORTH

MAGNETIC DECLINATION : 24° 42'
ANNUAL RATE OF CHANGE : 4.1'
U.S.G.S. EPOCH 1985

LEGEND

SD01 – DUMP AREAS

SS10 – WASTE ACCUMULATION AREA 6 AND FUEL RELEASES 2, 5, 6, 7, 9, AND 10

OT08 – FORMER WACS LOCATION

NOTE: ALL IRP SOURCE AREA LOCATIONS ARE APPROXIMATE

CONTOUR INTERVAL = 10'

0 100 200 400
SCALE IN FEET

INDIAN MOUNTAIN
LONG RANGE RADAR STATION

SOURCE AREAS
UPPER CAMP

PROJ. MGR.	ACAD FILE NO.	FIGURE NO.	
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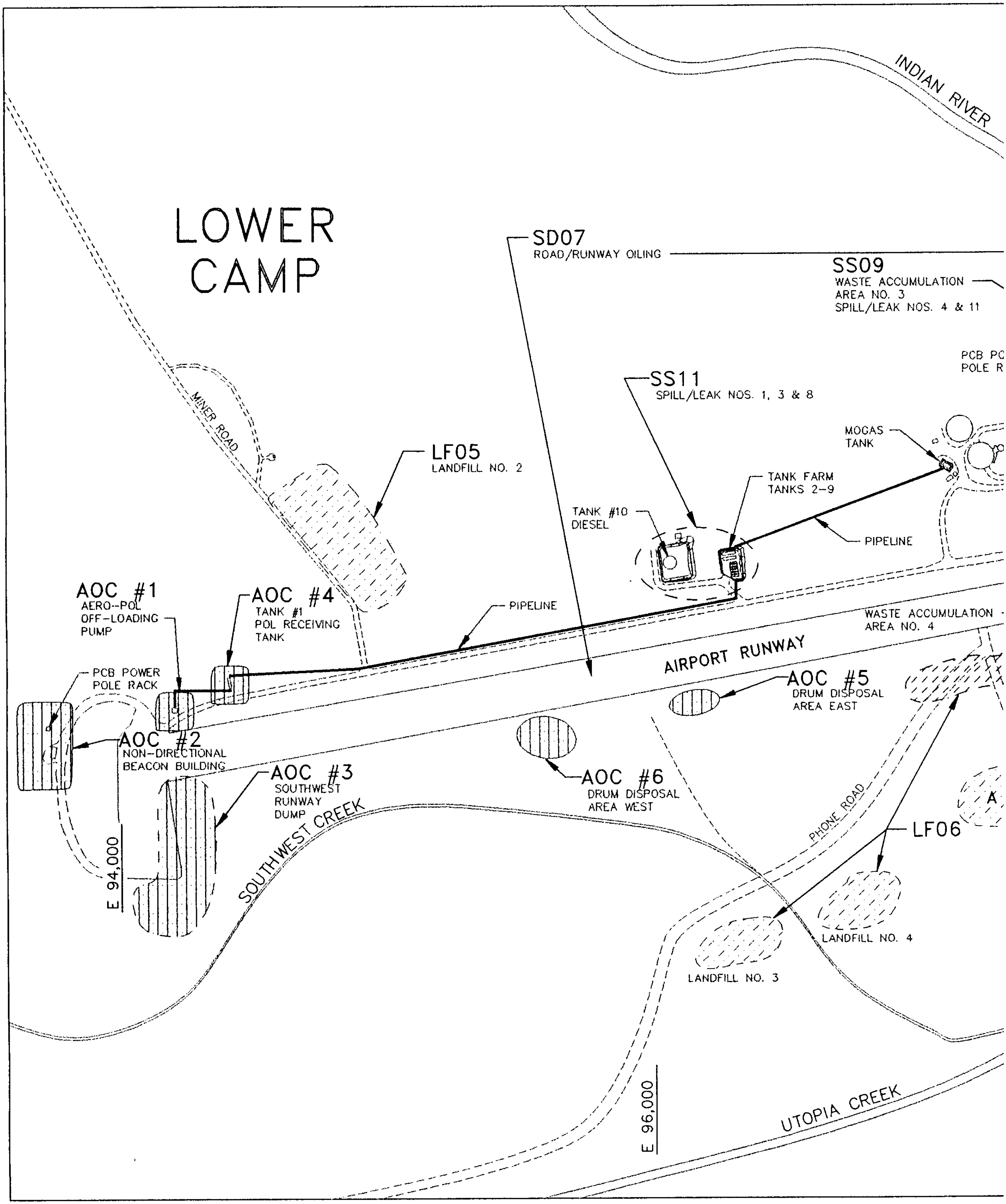
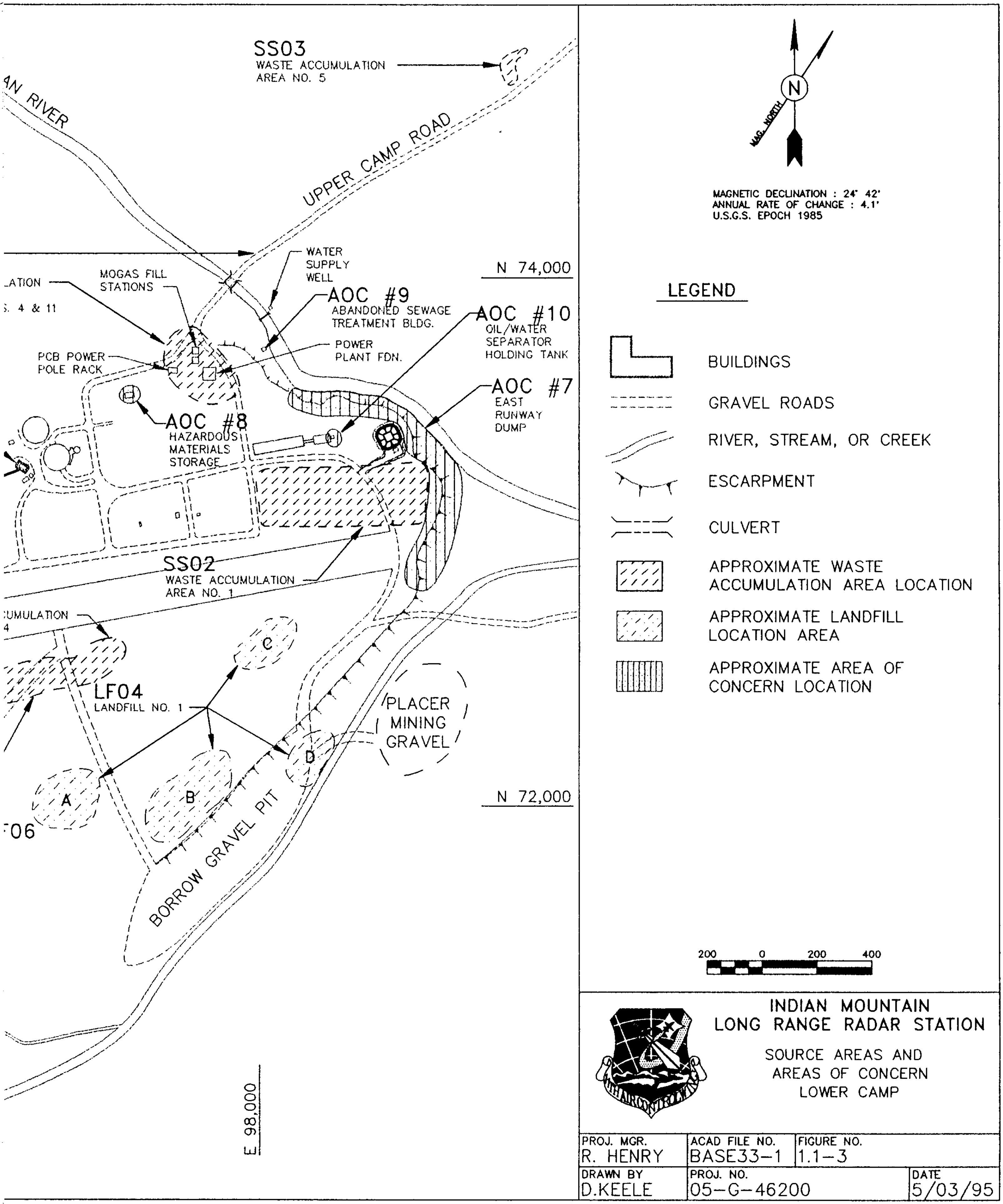


LOWER CAMP
INDIAN RIVER
SD07
ROAD/RUNWAY OILING
SS09
WASTE ACCUMULATION AREA NO. 3
SPILL/LEAK NOS. 4 & 11
PCB PO
POLE R
SS11
SPILL/LEAK NOS. 1, 3 & 8
MOCAS TANK
TANK FARM TANKS 2-9
TANK #10 DIESEL
PIPELINE
MINER ROAD
LF05
LANDFILL NO. 2
AOC #1
AERO--POL OFF-LOADING PUMP
AOC #4
TANK #1 POL RECEIVING TANK
PIPELINE
WASTE ACCUMULATION AREA NO. 4
AIRPORT RUNWAY
PCB POWER POLE RACK
AOC #5
DRUM DISPOSAL AREA EAST
AOC #2
NON-DIRECTIONAL BEACON BUILDING
AOC #3
SOUTHWEST RUNWAY DUMP
AOC #6
DRUM DISPOSAL AREA WEST
SOUTHWEST CREEK
PHONE ROAD
LF06
E 94,000
LANDFILL NO. 4
LANDFILL NO. 3
E 96,000
UTOPIA CREEK


SS03
WASTE ACCUMULATION AREA NO. 5
AN RIVER
UPPER CAMP ROAD
WATER SUPPLY WELL
MOGAS FILL STATIONS
-ATION
. 4 & 11
AOC #9
ABANDONED SEWAGE TREATMENT BLDG.
AOC #10
OIL/WATER SEPARATOR HOLDING TANK
PCB POWER POLE RACK
POWER PLANT FDN.
AOC #7
EAST RUNWAY DUMP
AOC #8
HAZARDOUS MATERIALS STORAGE
N 74,000
SS02
WASTE ACCUMULATION AREA NO. 1
UMULATION
4
LF04
LANDFILL NO. 1
A
B
C
D
PLACER MINING GRAVEL
BORROW GRAVEL PIT
N 72,000
F06
E 98,000
N
MAG. NORTH
MAGNETIC DECLINATION : 24° 42'
ANNUAL RATE OF CHANGE : 4.1'
U.S.G.S. EPOCH 1985
LEGEND
BUILDINGS
GRAVEL ROADS
RIVER, STREAM, OR CREEK
ESCARPMENT
CULVERT
APPROXIMATE WASTE ACCUMULATION AREA LOCATION
APPROXIMATE LANDFILL LOCATION AREA
APPROXIMATE AREA OF CONCERN LOCATION
200 0 200 400
INDIAN MOUNTAIN
LONG RANGE RADAR STATION
SOURCE AREAS AND AREAS OF CONCERN LOWER CAMP
PROJ. MGR. R. HENRY
ACAD FILE NO. BASE33-1
FIGURE NO. 1.1-3
DRAWN BY D.KEELE
PROJ. NO. 05-G-46200
DATE 5/03/95

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Area No. 6 and Spill/Leak Nos. 2, 5, 6, 7, and 10); and SS11 (Spill/Leak Nos. 1, 3, and 8). In addition, 10 areas of concern were investigated during the 1994 RI field session.

1.2 OBJECTIVES

The objectives of the four additional activities to be performed at the IMLRRS during the 1995 field season are described herein.

1.2.1 Diversion Ditch Objectives

The objective of the proposed diversion ditch system to be installed at OT08 is to contain source area SS10 contaminants in groundwater and intermittent surface water and prevent migration of this water into OT08. Diverting the water will prevent further fuel contamination of OT08 and will prevent migration of PCB contamination into groundwater and surface water. This addendum presents the work plan to locate, design, construct, startup, and maintain the diversion ditch system. This interim action is intended to operate for a limited amount of time while a more permanent solution is identified, designed, and implemented. It is anticipated that this document will serve as the design and specifications for this IRA.

1.2.2 Containment Cell

The objective of the proposed containment cell to be constructed at IMLRRS is to isolate and treat the 5 cubic yards of contaminated IDW soil generated during the 1994 RI activities. The containment cell to be constructed at the site is intended to biodegrade the petroleum hydrocarbon contaminants present in the IDW. The performance and results of the containment cell will also serve as a treatability study to provide site-specific data for evaluating and selecting potential future remedial action to eliminate soil or sediment contamination at IMLRRS. This addendum presents the work plan and criteria to locate, design, construct, and operate and maintain the

containment cell. This document will serve as the design and specifications for the containment cell.

1.2.3 Additional Characterization at Source Areas SS10, OT08, SS02, SS11, and SS09

Additional characterization is necessary at source areas SS10, OT08, SS02, SS11, and SS09 for several purposes including risk evaluations, assessment of contaminant migration, and evaluation of contaminant presence and extent for remedial and risk considerations. Section 4.0 provides specific information pertaining to activities at these source areas.

1.2.3.1 Source Area SS10

The analytical results of samples collected during the 1994 field season and the conclusions of the risk evaluation indicated PCP detected in surface water at SS10 posed an unacceptable ecological risk to the environment at IMLRRS. The objective of the additional sampling and analyses at the SS10 source area is to verify and further define the concentrations and extent of PCP contamination in surface water. Field analyses for PCP will be performed using immunoassay field test kits (EPA Method 4010). These results will be used to select locations for PCP laboratory analysis.

1.2.3.2 Source Area OT08

The 1994 RI results from source area OT08 indicated that PCBs are present at varying concentrations in soils. Source area OT08 will be revisited to determine the volume of soils contaminated with PCBs and the range of contaminant levels present. A combination of surface and subsurface soil samples will be collected, with emphasis on subsurface samples. Samples will be analyzed using immunoassay test kits (EPA Method 4020) and laboratory analysis (EPA Method 8080). Subsurface soil samples

will also be collected for geotechnical analysis in consideration of future potential remedial alternatives.

1.2.3.3 Source Area SS02

Shallow subsurface soils collected during the 1994 field effort were used to characterize human and ecological risk. These data were extrapolated to surface conditions and through risk evaluation were found to pose unacceptable risk to both human and ecological receptors. Surface soils will be collected during the 1995 field effort and will be evaluated to more accurately assess the potential risk. Samples will be collected for laboratory analysis.

1.2.3.4 Source Area SS11

During the 1994 field effort, one sediment sample was collected at source area SS11 for laboratory analysis. This sample contained high levels of fuel hydrocarbons. In order to more fully assess and characterize contaminant distribution at the source area, additional surface soil samples will be collected. Field screening immunoassay (EPA Method 4030) test kits will be utilized for this purpose, with subsequent samples collected for fixed laboratory analysis based on the screening data.

1.2.3.5 Source Area SS09

Four monitoring wells were installed during the 1994 field season. These wells, in addition to the station water supply well, were sampled to characterize contaminant type, concentration, and distribution. Petroleum hydrocarbon and volatile organic compounds were detected. The intent of additional sampling at these wells in 1995 is to assess current contaminant concentrations and distribution, potential impacts to the station water supply well, and more fully characterize contaminant migration.

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2.0 INTERIM REMEDIAL ACTION

This section describes the planned IRA at Upper Camp source area OT08. The objective of the IRA is to collect and divert shallow groundwater that is migrating in the subsurface northwest of the former WACS building location shown in Figure 1.1-2. The shallow groundwater collected upgradient of OT08 will be diverted by means of a diversion ditch around the site to prevent the potential mobilization and offsite migration of PCB contamination. The topics presented in this section include site characteristics, diversion ditch design considerations, description and construction, and sampling and analysis.

2.1 SITE CHARACTERISTICS

Source Area OT08 is the former location of the White Alice Communications System (WACS) for Indian Mountain. OT08 is located at Upper Camp on the east side of and below the mountain top (Plate 1). The WACS for Indian Mountain was activated in 1958, deactivated in 1979, and demolished in 1986. The primary contaminants of concern at the WACS are PCBs from transformer oil. Before 1985, 240 drums containing PCB-contaminated soil and 85 drums of PCB-contaminated oil were removed from the site. The source of these drums is not known, but it is suspected that they were generated during the Air Force's Alaska Cleanup Effort conducted in the 1980s. There are currently no structures at OT08.

The geology of Upper Camp was partially characterized during the RI field activities. Due to the coarse nature of unconsolidated materials at Upper Camp, a backhoe was used to collect subsurface soils. The walls of the tests pits were observed for lithologic characteristics. Test pits were excavated at both the upper bench and lower bench areas of Upper Camp located approximately 2,000 feet from OT08. The lithology of all tests pits was consistent and is characterized by angular andesitic boulders and gravel with a silty clay matrix. The depth to competent bedrock was

estimated in all the test pits based on refusal. Depths range from approximately 3 to 4 feet below ground surface.

Presumably, the PCBs released to the surface at OT08 are infiltrating the coarse surface materials and migrating down to the bedrock surface. The ecological risk evaluation and risk management evaluation performed during RI report preparation identified PCBs in the soil as posing an unacceptable risk to the environment.

2.2 DESIGN CONSIDERATIONS

Selecting, designing, installing, and maintaining a groundwater recovery system at a remote site located 35 miles south of the Arctic Circle presents unusual considerations. The basic philosophy used to design the diversion ditch system was to keep the system as simple as possible due to the remoteness and climatic conditions of the IMLRRS site. The design considerations used during development of the IRA system are discussed below.

2.2.1 Temperature

The monthly mean temperature at IMLRRS ranges from -7 degrees Fahrenheit (° F) in January to 58° F in July. The reported extremes at IMLRRS are a maximum temperature of 89° F in July, and a minimum of -65° F in January (Air Force 1994a). The historical temperatures experienced at the IMLRRS affect the components of the proposed IRA system. The IRA components will be subjected to temperatures in the range of 89° F in summer and -65° F in winter. All components will be chosen to withstand these temperature extremes.

2.2.2 Topography

The topography directly upslope of the OT08 pond has a grade of about 10 feet in 30 feet. The topography at the former location of the WACS building is 10 feet in 160

feet. The slope at the former building location should not affect the procedures used to excavate and construct the diversion ditch. The topography of the area should allow for gravity flow in the diversion ditch. Safety and health procedures for trench excavation will be included in an addendum to the existing Indian Mountain Health and Safety Plan.

2.2.3 Remoteness

The remote location of the IMLRRS will require all of the materials and equipment necessary to construct the IRA be available at the site or transported to the site by air. The largest-capacity aircraft that is capable of using the airstrip at IMLRRS is a Lockheed L-100 Hercules. The dimensions and weight limit for this aircraft are 9 feet high by 9 feet wide by 35 feet long, and 30,000 pounds, respectively.

2.3 DIVERSION DITCH DESCRIPTION

The proposed IRA collection system consists of a lined diversion ditch and sampling port. The diversion ditch will collect and divert shallow groundwater. The sampling port will be installed within the diversion ditch to allow for sample collection of diverted water. Groundwater will drain by gravity flow through the entire system and will discharge into the shallow aquifer, downgradient of OT08.

The collection system specifications presented in this addendum are in accordance with the suggested practices presented in *Leachate Plume Management* (EPA 1985) for subsurface drains. The *Work Plan and Sampling and Analysis Plan for Interim Remedial Actions, Cape Lisburne Radar Station, Alaska* (Air Force 1994c) was also reviewed in preparing this document for the IMLRRS.

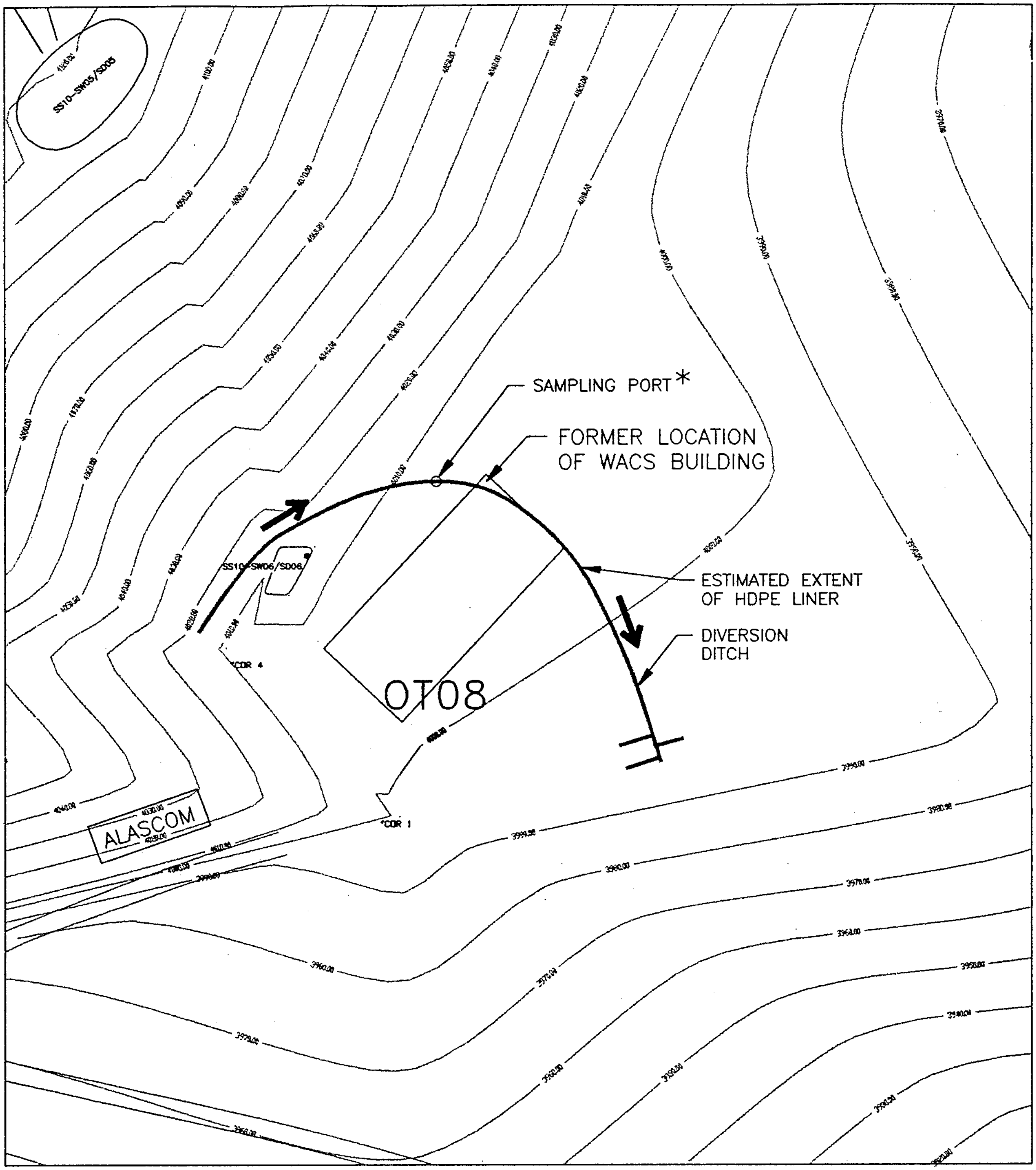
The ditch will be excavated to the bedrock formation in order to collect water present within the unconsolidated materials above bedrock. It is estimated that bedrock will

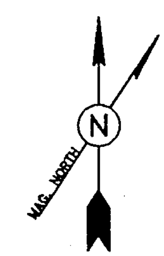
be encountered at 5 to 10 feet below ground surface. The depth to groundwater in the area of the ditch is currently unknown. The diversion ditch is expected to be 300 to 500 feet in length. The actual length will be determined during the excavation process. The bottom of the trench will be sloped at a rate of 1 foot per 100 feet towards the end of the ditch. This grade will facilitate flow towards the sampling port, with continued flow to the end of the ditch. The grade will be maintained by using land surveying techniques and equipment. An accuracy of plus or minus 0.1 foot will be maintained for the ditch floor grade. Figure 2.3-1 presents a plan view of the diversion ditch and Figure 2.3-2 shows a cross-sectional view of the diversion ditch and sampling port.

A 30-mil, impermeable HDPE liner will cover the bottom of the ditch and the downgradient wall of the diversion ditch. This impermeable barrier will ensure that shallow groundwater migration through the OT08 area is intercepted and diverted. The liner will extend from the upgradient end of the ditch to an area downgradient of OT08. The ditch will continue beyond the downgradient end of the liner to facilitate diverted water discharge into the shallow aquifer. At the end of the diversion ditch, three, small excavations will be made perpendicular to the diversion ditch. These small ditches will also facilitate the discharge of diverted water back into the unconsolidated aquifer materials.

A 30-mil HDPE liner was selected to minimize the potential for puncture or tearing during placement and the operational life of the ditch. Once exact HDPE material selections are made the specifications will be forwarded to the Air Force for review and will be included as part of Appendix A.

The location of the sampling port will be downgradient of the groundwater and surface water catchment area, and will be determined in the field. Current knowledge suggests that the port will be installed at the approximate location depicted in Figure 2.3-1. The sampling port will be constructed of 2-inch-inside-diameter (ID) prepacked screen. Specifications are provided in Appendix A. The sampling port will consist of a 6-inch sump attached to the bottom end of the screened interval. The sump will





MAGNETIC DECLINATION : 24° 42'
ANNUAL RATE OF CHANGE : 4.1'
U.S.G.S. EPOCH 1985

* EXACT LOCATION TO BE DETERMINED IN THE FIELD

→ ANTICIPATED GROUNDWATER AND SURFACE WATER FLOW DIRECTION

CONTOUR INTERVAL = 10'

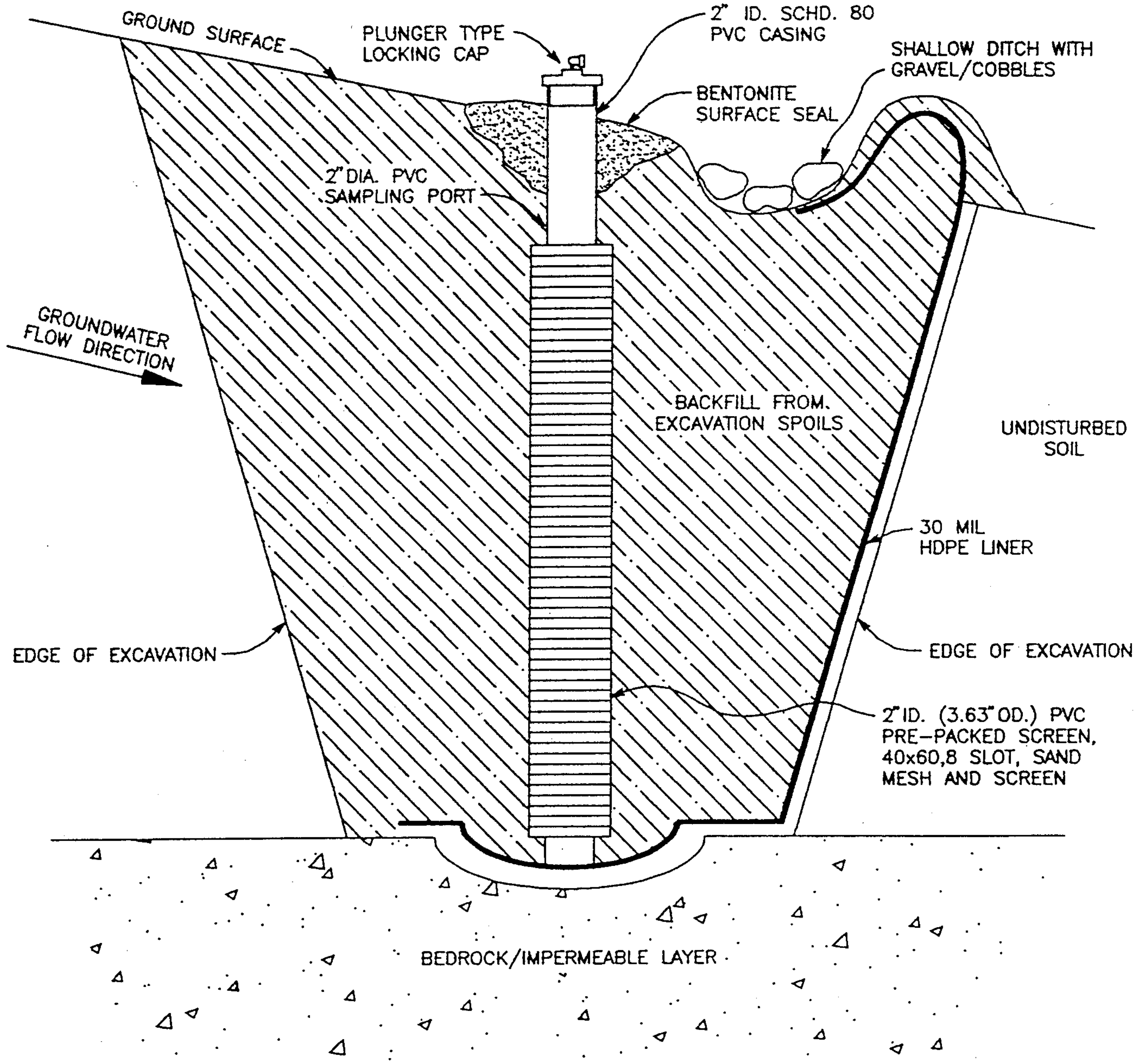
0 50 100 200

SCALE IN FEET

INDIAN MOUNTAIN
LONG RANGE RADAR STATION

DIVERSION DITCH
PLAN VIEW
OT08 INTERIM REMEDIAL ACTION

PROJ. MGR.	ACAD FILE NO.	FIGURE NO.	
R.HENRY	ITPV2	2.3-1	
DRAWN BY	PROJ. NO.		DATE
D.KEELE	05-G-46200		5/03/95



NOT TO SCALE

INDIAN MOUNTAIN LONG RANGE RADAR STATION

DIVERSION DITCH & SAMPLING PORT CROSS SECTION OT08 INTERIM REMEDIAL ACTION

PROJ. MGR.	ACAD FILE NO.	FIGURE NO.	
R.HENRY	ITCS2	2.3-2	
DRAWN BY	PROJ. NO.		DATE
D.KEELE	05-G-46200		5/02/95

allow for settlement of fine materials that may flow through the ditch. Because the depth of the ditch is currently unknown, the length of the screened interval will be determined during the diversion ditch construction. It is anticipated that the screened interval will be 2.5 feet to 5 feet in length. Two-inch ID PVC casing will be attached to the top of the screened interval and will extend from the top of the screen to above ground surface. A lockable, plunger-type cap will be placed in the top of the casing opening. In order to prevent potential migration of surface contaminants down the side of the PVC casing, bentonite will placed around the casing.

2.4 DIVERSION DITCH CONSTRUCTION

The diversion ditch system will be constructed in three sequential phases. The first phase will be the excavation of the ditch and sampling port sump. The second phase will consist of installing the liner. The third phase will be the installation of the sampling port and backfilling of excavated soils.

2.4.1 Phase I

An excavator or backhoe will be used to excavate the ditch. Attempts will be made to excavate the bedrock material at the location of the sampling port sump. The excavated soil will be placed adjacent to the ditch.

The diversion ditch depth and grade will be monitored by land surveying techniques during the excavation process using an automatic level and stadia rod. A minimum of one target grade control point will be established and monitored for every 25 linear feet of ditch excavation. A vertical accuracy of plus or minus 0.1 foot will be maintained.

The U.S. Department of Labor Occupational Safety and Health Administration (OSHA) regulations for trench excavations described in Part 29 of the Code of Federal Regulations (CFR) Section 1926.652 will be met. If required, shoring or a trench

shield will be used during excavation procedures to provide cave-in protection. It is expected that, based on the topographic relief of the hillside, shoring or shielding will not be necessary.

If dewatering techniques are required during excavation operations, a pump will be used to control inflow. The pump effluent will be discharged to the surface drainage downgradient of OT08.

2.4.2 Phase II

Once the diversion ditch excavations have been completed the liner will be installed. The liner will be manually installed beginning at the effluent end of the system (downgradient of OT08), progressing towards the distal (upgradient) end. The liner will be placed on the bottom of the ditch and placed over the downgradient wall of the ditch. Excess liner material will be placed over a low berm constructed on the downgradient side of the ditch. When excavated soils are placed back into the ditch, the liner will be covered with additional soils.

2.4.3 Phase III

The ditch will be backfilled with soils from the excavation. The soils will be monitored with a photoionization detector (PID) and petroleum hydrocarbon test kit analyses (EPA Method 4030) will be performed (Table 2.8-1) to determine areas where excavated soils contain elevated hydrocarbon contamination. Soils that exhibit high levels of organics will be placed into the ditch first. Any excess soil that shows high levels of organics will be transported to the IDW containment cell.

The sampling port will be installed during the diversion ditch backfilling operation. The sampling port will be held in place manually as excavated soils are placed back into the lined ditch. It is expected that the bottom of the sampling port will rest on the

liner material on the bottom of the ditch. The sampling port will be positioned so that it is vertically plumb.

A shallow ditch will be formed in the backfilled material in the surface water catchment area. The ditch will be filled with a highly permeable rip-rap material. This design will ensure that surface water moving by sheet-flow will be captured in the diversion ditch.

2.5 SAMPLING AND ANALYSIS

In addition to the soil samples analyzed by test kits, water samples will be collected from the sampling port after the ditch construction is complete. An initial water sample will be collected to determine the presence and concentration of contaminants present in the ditch. The water sample will be analyzed for GRO (Method AK 101) and DRO (Method AK 102). A second water sample will be collected from the sampling port and analyzed for the same parameters as the initial sample after the soils have settled, about one week after ditch completion. This sample will be collected to further assess contaminant type and concentration. In order to obtain a representative sample of water in the ditch, three volumes of water in the sampling port will be removed prior to sample collection. Sample collection will be performed as specified for groundwater monitoring wells in the Indian Mountain LRRS, RI/FS Sampling and Analysis Plan (Air Force 1994b).

TABLE 2.8-1
Summary of Analyses for the Diversion Ditch

Number of Samples	Media	Laboratory Analyses	Test Kit Analyses
2	Water	GRO and DRO	None
4	Soil		TPH detection limits of 50 and 200 mg/kg
1 (QA/QC)	Water	GRO and DRO	None

Notes:
GRO = gasoline range organics
DRO = diesel range organics
TPH = total petroleum hydrocarbons

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3.0 CONTAINMENT CELL

This section describes the containment cell to be constructed and operated at IMLRRS. The purpose of the containment cell is to consolidate, contain, and biodegrade contaminated IDW soil generated during the 1994 field investigation. Thirty-two drums of IDW soil were generated. All drums were labeled and numbered when filled. Complete or partial analytical data exist for soils in 29 of the drums. Two drums containing sediment from the decontamination unit have not been characterized (drums 26 and 32). The analytical results for the IDW sampling concluded that 11 of the 30 characterized soil waste drums contained petroleum hydrocarbon wastes at levels requiring treatment (Jacobs 1995). These drums are numbered: 1, 3, 4, 11, 13, 15, 17, 24, 25, 30, and 33. The containment cell selected to meet these objectives is an ex situ land treatment unit.. The topics presented in this section include site selection, design considerations, system description, construction, operation and maintenance, and sampling and analysis. The soils contained in the other 18 drums have been shown through analytical data to not contain contamination. These soils will be emptied from the drums at the station landfill for use in the landfilling operations. These drums are numbered: 2, 5, 6, 7, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 27, 28, 29, and 31. The two drums that have not been characterized, 26 and 32, will be sampled during the 1995 field effort for contaminant characterization.

3.1 SITE SELECTION

To select a suitable site to construct and operate a containment cell at the IMLRRS several criteria must be met. Criteria considered for site placement include the following:

- located in an area that is relatively inactive;
- not located within the 10-year floodplain;

- substantial recontouring of the ground surface not required and an existing grade less than 2 percent;
- exposed to sunlight with minimal natural canopy cover obstructions;
- the site must be accessible by motor vehicles; and
- be in the vicinity of Lower Camp.

Several sites at IMLRRS meet these criteria and were considered for selection as the containment cell site location. The sites (shown in Figure 3.1-1) included the following:

- Site No. 1—the location where the IDW is currently staged;
- Site No. 2—west of source area SS02, north of the runway; and
- Site No. 3—the station landfill.

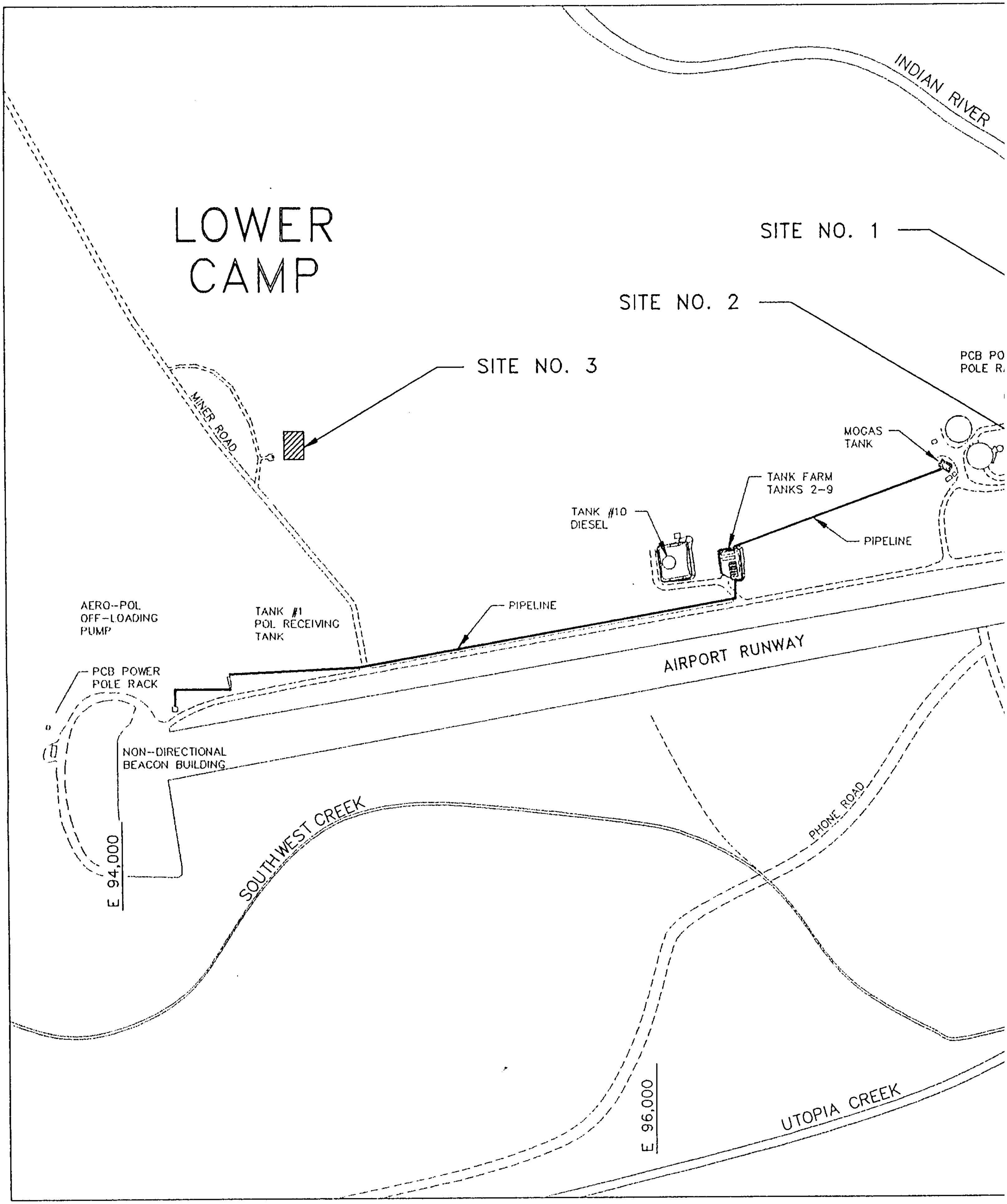
Site No. 1 was selected as the area to locate the containment cell. Site No. 1 meets all of the selection criteria and is considered superior to all of the other sites primarily due to the proximity of the stored IDW. Figure 3.1-1 shows the sites considered for selection as the containment cell location.

3.2 DESIGN CONSIDERATIONS

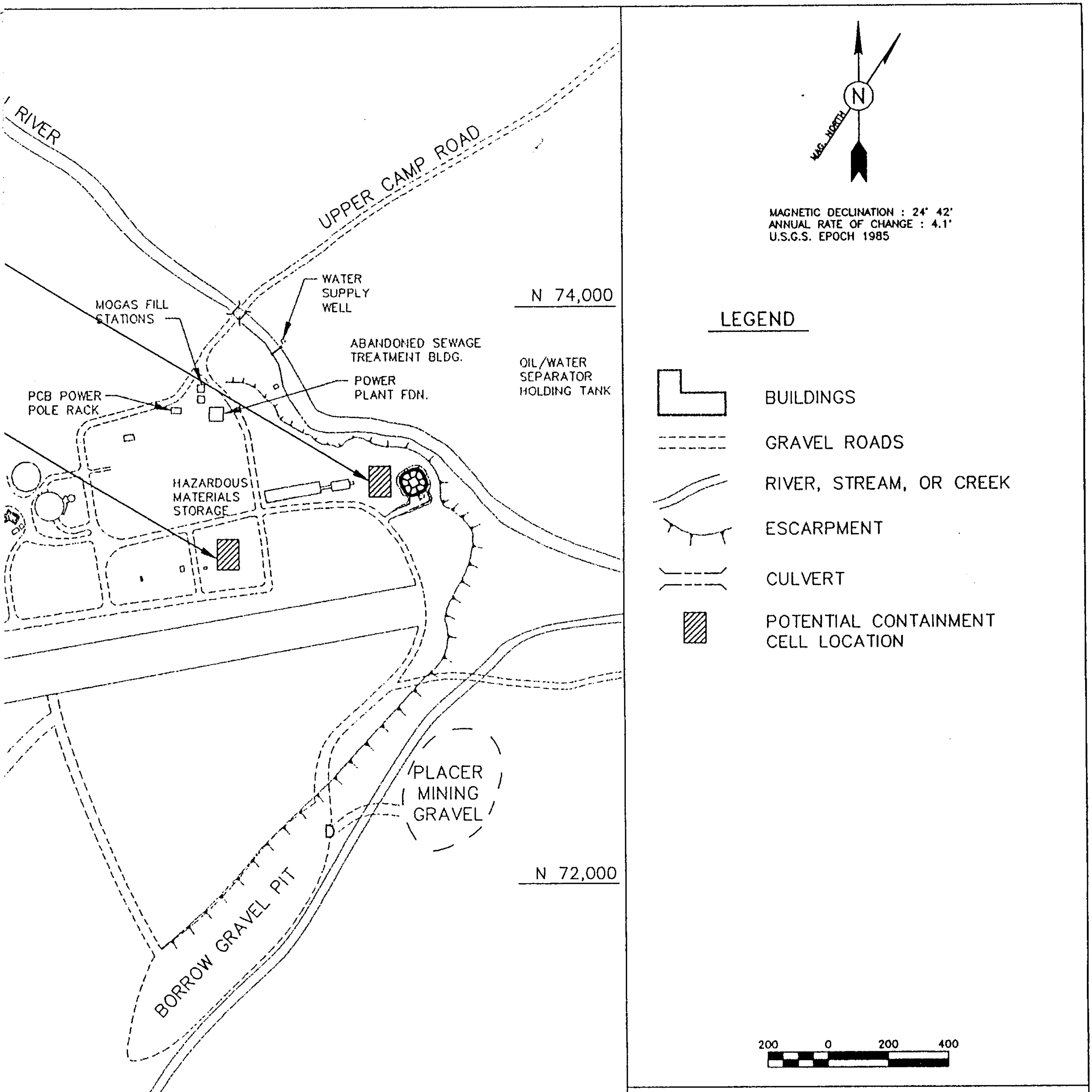
Designing, installing, operating, and maintaining a containment cell at a remote site located 35 miles south of the Arctic Circle presents unusual considerations. The basic philosophy used to design the containment cell was to keep the system as simple as possible due to the remoteness and climatic conditions of the IMLRRS site. The design considerations used during development of the containment cell are essentially the same as those presented for the diversion ditch in Section 2.3.

3.3 CONTAINMENT CELL DESCRIPTION

The proposed containment cell consists of a containment structure, liner system, leachate collection system, ventilation system, and surface cover. The containment



INDIAN RIVER
LOWER CAMP
SITE NO. 1
SITE NO. 2
SITE NO. 3
PCB PO
POLE R
MINER ROAD
MOGAS TANK
TANK FARM TANKS 2-9
TANK #10 DIESEL
PIPELINE
AERO-POL OFF-LOADING PUMP
TANK #1 POL RECEIVING TANK
PIPELINE
PCB POWER POLE RACK
AIRPORT RUNWAY
NON-DIRECTIONAL BEACON BUILDING
SOUTHWEST CREEK
PHONE ROAD
E 94,000
E 96,000
UTOPIA CREEK



INDIAN MOUNTAIN
LONG RANGE RADAR STATION

POTENTIAL CONTAINMENT
CELL LOCATIONS

PROJ. MGR.	ACAD FILE NO.	FIGURE NO.	
R. HENRY	PCCL	3.1-1	
DRAWN BY D.KEELE	PROJ. NO. 05-G-46200		DATE 5/04/95

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structure will be an earthen berm to provide a structural barrier to contain the IDW soil. The liner system will prevent the IDW from coming in contact with the surrounding soil and the base will be sloped to collect leachate produced during operation of the containment cell. The leachate collection system will include a sump and will collect and contain the leachate (if any) produced during operation of the containment cell. The ventilation system will be passive and will supply oxygen to the containment cell and eliminate any gas phase biodegradation by-products. A polyethylene surface cover will be used to control infiltrating precipitation, prevent wind erosion, and collect solar radiation for supplemental heating. Figure 3.3-1 is a schematic of the Indian Mountain ex situ land treatment unit. At this time, exact containment cell material specifications are not available. Once material selections are made, the specifications will be forwarded to the Air Force for review and will be included as part of Appendix A.

The containment cell specifications presented in this addendum are based on the suggested practices and case history experience presented in *Remediation of Hazardous Waste Contaminated Soils* (Wise and Trantolo 1994) and *Test Plan and Technical Protocol for a Field Treatability Test for Bioventing* (Air Force 1992) for engineering application of biooxidation processes for treating petroleum-contaminated soil. The *Addendum to Work Plan and Sampling and Analysis Plan for Interim Remedial Actions, Cape Lisburne Radar Station, Alaska* (Air Force 1994d) was also reviewed in preparing this document for the IMLRRS.

3.3.1 Containment Structure

The containment structure will consist of an earthen berm approximately 2 feet high. The earthen berm will serve several purposes that include preventing IDW contact with the surrounding soil, forming a structural support for the liner system, acting as spill containment unit for the leachate collection system sump, and collecting any precipitation runoff from the surface cover. The dimensions of the containment

structure are based on three criteria. This first criterion is the volume of IDW. The second criterion is the maximum depth of contaminated soil to be placed in the containment cell. Based on a typical soil pile design without forced air aeration, the maximum depth should not exceed 18 inches (Wise and Trantolo 1994). The third criterion limits the dimensions of a passive aeration unit to 10 feet in maximum width (Wise and Trantolo 1994).

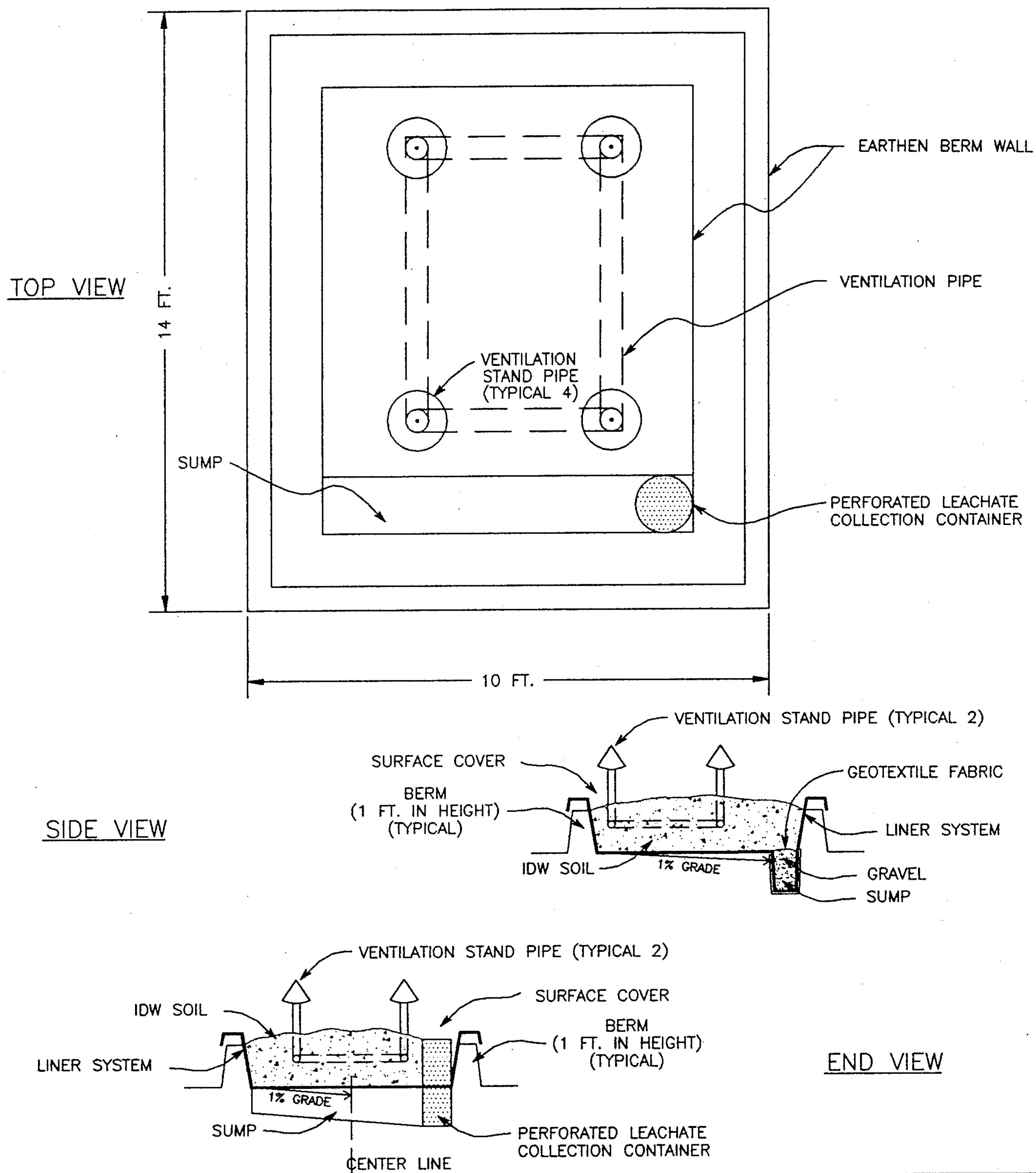
To determine the dimensions of the containment cell structure the estimated volume of IDW and the maximum design width and depth were used. The reported volume of petroleum hydrocarbon IDW at IMLRRS is 5 cubic yards (yd^3) (Jacobs 1995). Based on a recommended soil depth of 18 inches and a width of 10 feet (Wise and Trantolo 1994), the minimum required length of the containment cell is 11 feet. An additional 3 feet will be added to the length of the cell to include the leachate collection system sump and create some additional space if it is necessary. As a result, the earthen berm will be 10 feet wide, 14 feet long, and 1 foot high.

3.3.2 Liner System

The liner will cover the earthen berm and the floors of the containment cell and leachate collection system sump. The liner system will consist of 30-mil HDPE. A 20-mil HDPE liner is a typical liner material and thickness (Wise and Trantolo 1994). A sand layer is usually placed between the liner and soil for leachate flow and liner protection. The sand is not required for adequate leachate flow and it is not practical to transport the volume of sand needed to the site. Because a sand layer will not be used between the soils and the liner, the thicker (30 mil) liner is proposed.

3.3.3 Leachate Collection System

The leachate collection system will consist of a collection sump positioned within the perimeter of the earthen berm. The sump will be located at the lowest end of the



NOT TO SCALE

INDIAN MOUNTAIN
LONG RANGE RADAR STATION

IDW CONTAINMENT
CELL SCHEMATIC

PROJ. MGR.	ACAD FILE NO.	FIGURE NO.	
R.HENRY	IDWCCS	3.3–1	
DRAWN BY	PROJ. NO.		DATE
D.KEELE	05–G–46200		5/04/95

containment cell and will be 10 feet long, 18 inches deep, and 18 inches wide. The sump will be sloped so that leachate will collect in one end of the sump. The sump will be filled with gravel available onsite. Geotextile fabric will be wrapped around the gravel to prevent IDW soil from filling the sump. A slotted container large enough to be sampled will be installed in the deepest part of the sump. The volume of leachate in the container will be checked periodically during the summer months and emptied over the soil pile.

3.3.4 Ventilation System

The ventilation system will consist of a 2-inch diameter, polyvinyl chloride (PVC), ¼-inch perforated drain pipe network. A 2-inch diameter pipe is recommended because it is least expensive. Also, a large pipe is not required to enhance oxidation of soils (Wise and Trantolo 1994). The piping network will consist of two sets of parallel lines of perforated pipe enclosed in geotextile fabric and connected at the ends. At each corner, a solid, vertical section of pipe that extends 6 feet above the containment unit cover will be installed to allow airflow through the soils. The ventilation system will also allow carbon dioxide and methane produced by biodegradation to escape and will allow for air flow through the soils to maintain aerobic conditions. Wise and Trantolo (1994) suggest that molecular oxygen is viewed as the major factor limiting the rate of hydrocarbon degradation in soils piles. Gravels and small boulders present in the IDW soils will also enhance aerobic conditions. The lateral ventilation system pipes will be located 3 feet from the side of the earthen berm on all sides of the containment cell. The piping network will be placed 6 inches above the system liner. Geotextile fabric will be used to prevent soil from entering the pipe.

3.3.5 Surface Cover

The surface cover will be (1) able to withstand a temperature of -25° F, (2) ultraviolet (UV) stabilized to prevent photodegradation, (3) 20-mil polyethylene, (4) black in color, and (5) one continuous piece that does not require seaming. The surface cover

will be secured to the berm by sand bags or similar heavy objects available at the site. The cover will be supported to ensure that water does not collect on the cover. This is a typical soil pile cover design. Weather resistance is the most important selection criteria. A black cover is desirable to maintain soil temperatures conducive to microbial activity.

3.4 CONTAINMENT CELL CONSTRUCTION

The containment cell will be constructed in three sequential phases. The first phase will be to prepare the site. The second phase will be the installation of the containment cell. The third and final phase will be the placement of the IDW into the containment cell and application of the surface cover material.

3.4.1 Phase I

Phase I consists of preparing the site for installation of the containment cell. The ground surface at the site of the containment cell will be cleared of any debris, including large rocks and any objects (such as exposed roots) that may rupture the liner system. The ground surface will be recontoured to a grade of 1 percent along the long axis and sloped towards the leachate collection sump. The same grade will be maintained perpendicular to the long axis and sloped towards the centerline. This will facilitate gravity drainage of the leachate to the sump. The sump will then be excavated at the downgradient end of the containment cell. As previously specified, the sump will be 18 inches deep, 18 inches wide, and will run the entire width of the containment cell.

3.4.2 Phase II

The installation of the containment cell will consist of constructing the earthen berm and installing the liner system. The berm will be constructed of native soil using a backhoe, or excavator. The berm will be 1 foot high. The final inside dimensions of the containment cell will be 10 feet wide and 14 feet long. Once the berms have been

completed, the 30-mil HDPE liner will be placed over the floor of the containment cell and earthen berm. The liner will cover the floor of the containment cell and the inside and outside of the berms. Native soil will be placed over the perimeter of the liner to secure the liner to the outside of the berm walls. The liner will be of sufficient width so that field seaming will not be required. A liner width of 22 to 24 feet will be sufficient to construct a 10-foot wide containment cell. The final width of the liner will be dependent on vendor configurations.

3.4.3 Phase III

The placement of the IDW into the containment cell will be the final phase of construction. Prior to placing the IDW into the containment cell the soil pH will be determined by field test kits (or litmus paper). Soil pH values ranging from 6 to 8 are required for aerobic biodegradation. Acidic soils will require amendment with calcium carbonate limestone or dolomitic limestone to raise soil pH and provide a source of cations. Alkaline soils will require amendment with aluminum sulfate to lower the pH to the required range. The addition of these materials is contingent on soil pH and nutrient analyses and will be performed during a separate site visit, if required. Soil pH will also be measured in composite samples after all soils have been placed within the unit.

After the initial 6-inch lift of IDW has been placed into and homogenized within the containment cell, the ventilation system will be installed. A 2-inch diameter, perforated drain pipe will be placed by hand directly on top of the initial 6-inch lift of IDW soil. The two sets of lateral ventilation lines will be connected as a rectangle. The lines will be located 3 feet from the sides of the berm wall. A vertical stand pipe will be constructed at each corner. The stand pipes will be constructed of solid 2-inch-diameter PVC and will have a cover on the top that allows air flow and prevents precipitation from entering the pipe. The elevation of the top of the stand pipe will be 6 feet higher than the top of the unit cover. The remainder of the IDW will then be

placed into and homogenized within the containment cell. The equipment used to handle the IDW will then be decontaminated over the sump. A thermocouple designed to measure soil temperature will be installed at this time. It will be placed in the soil at the sump end of the unit. A K type thermocouple and lead will be installed. The thermocouple lead will have a two-prong connect which can be connected to a portable readout device. Specifications of the temperature measurement system are included in Appendix A.

The last phase III activity will be to place the surface cover over the containment cell. The surface cover will be secured to the berm wall. The stand pipes for the ventilation system will be secured to the liner to prevent precipitation from entering the containment cell.

3.5 SAMPLING AND ANALYSIS

An evaluation of IDW generated during the 1994 RI concluded that two drums, both filled with sediment from the decontamination pad, require sampling and characterization. One composite sample will be collected from each drum and submitted to the laboratory for VOCs and metals (rapid turnaround) and TCLP analysis. Proposed laboratory samples for IDW characterization, and laboratory and test kit samples for the containment unit are summarized in Table 3.5-1. Based on the results of the VOCs and metals analyses, the disposition of the soils in those two drums will be determined in the field. If the soils in the drums are shown to not contain contamination, the soil will be deposited in the containment unit. If the soils contain elevated VOCs and metals concentrations, the drums will be held pending TCLP results.

TABLE 3.5-1
Summary of Analyses for the IDW Containment Unit

Number of Samples	Media	Laboratory Analyses	Test Kit Analyses
4	sediment	2 TCLP(normal turnaround) 2 VOCs and Metals (rapid turnaround)	None
3	soil	GRO and DRO	None
8	soil		TPH detection limits of 50 and 200 mg/kg
3	soil	nutrients (see Notes)	None

Notes:
DRO = diesel range organics
GRO = gasoline range organics
TCLP = Toxicity Characteristic Leachate Procedure
TPH = total petroleum hydrocarbons

Nutrient analyses will include total kjeldahl nitrogen, total phosphorus, alkalinity, total iron, and moisture content.

For the containment cell, three composite samples from 12 random locations will be submitted to the laboratory for GRO and DRO analysis after construction and startup. Three additional samples will be submitted for a suite of nutrient analyses including total kjeldahl nitrogen (E351.2), total phosphorus (E365.4), alkalinity (E310), total iron (SW7380), and moisture content (D2216). As mentioned in the previous section, the nutrient samples should be collected from contaminated soils to provide baseline information regarding the biodegradation potential of the soils. Three GRO/DRO and nutrient analyses are proposed to increase the likelihood that results are representative of soil pile conditions. Additionally, up to eight petroleum hydrocarbon field test kit (immunoassay) analyses will be completed (Method 4030). These samples are proposed because if field test kit and lab results correlate, future operational samples can be evaluated with field test kits, which are more practical than laboratory analysis. Three field test kit samples will be collected at the same time and locations as the GRO/DRO laboratory samples. The remaining field test kit samples will be collected at other locations within the containment unit, and will be used for soils characterization. The test kit results will be used to select locations for nutrient analysis samples. Information pertaining to test kits is included in Appendix B.

An equipment rinsate sample may be collected from tools used to sample the containment. The timing of sampling will dictate when equipment rinsate samples are collected. Measurements of carbon dioxide (CO_2) and oxygen (O_2) concentrations in the soil pile will be made a day or two after the cover is in place. These baseline data will indicate if sufficient oxygen is present for aerobic activity (2-4% O_2) and can be compared to future measurements as an indicator of microbial activity. Typical O_2 and CO_2 levels at an uncontaminated site are 15 to 20% and 1 to 5%, respectively (Air Force 1992).

3.6 CONTAINMENT CELL OPERATION AND MAINTENANCE

The containment cell is designed so that little maintenance is required. It is anticipated that the microorganisms will be most active during the freeze-free period from June through September. A maintenance log will be prepared and remain onsite for the life of the containment cell. Each year that the system is in operation, the first two bulleted activities listed below will be performed during the active or summer period in years following 1995. The first two activities will be performed by site personnel who will be trained during system construction. These and other activities planned for 1995 include the following:

- The sump will be visually monitored for leachate collected. The leachate will be collected as necessary and reapplied to the IDW. The volume of leachate will be estimated. The results of these activities will be recorded in the maintenance log.
- The soil temperature of the IDW will be monitored and recorded in the maintenance log. If remedial activities are conducted at IMLRRS in the future, the frequency of temperature monitoring should be increased to at least monthly.
- Three composite samples from 12 random locations will be collected from the IDW in the containment cell. The samples will be analyzed by the laboratory to determine DRO and GRO concentrations. A TPH test kit analysis will be performed using soil from each of the composite samples. The locations will be recorded in the maintenance log. TPH test kit analysis, and CO_2 and O_2 measurements, should be made on an annual basis.
- Three additional samples will be analyzed by the laboratory for the following nutrients: total kjeldahl nitrogen (E351.2), total phosphorus (E365.4), alkalinity

(E310), total iron (SW7380), and moisture content (D2216). It is important that samples for nutrient analyses be collected from a contaminated zone; otherwise, if fixation has already occurred, the nitrogen concentration measured in samples collected from less contaminated soils may not be representative of biodegradation potential (Air Force 1992). A field measurement of pH in soils collected for laboratory analysis will also be made and recorded.

- An estimate of required residence time in the cell will be made, based on 1995 analytical results, and included in a letter report (discussed in Section 6.0).

4.0 ADDITIONAL CHARACTERIZATION OF SOURCE AREAS SS10, OT08, SS02, SS11, AND SS09

Additional sampling is planned for source areas SS10 and OT08 at Upper Camp in an effort to determine the extent of contamination above applicable risk levels. Surface soil sampling is proposed for source areas SS02 and SS11 at Lower Camp to assess the presence and extent of surface contamination at these areas and to provide data necessary for risk evaluation. Sampling of existing groundwater monitoring wells and the station drinking water well is proposed for SS09, also located at Lower Camp. These results will be used to assess the presence of contamination in groundwater at SS09 and in the supply well, and determine whether contaminants detected in 1994 have migrated or decreased in concentration.

4.1 SOURCE AREA SS10

PCP, a semivolatile organic compound commonly used as a wood preservative, was detected in SS10 surface water in two samples at levels in excess of ambient water quality criteria (AWQC). These samples were collected from an intermittent seep on the south side of the upper bench and a small drainage north of the former fuel tank locations on the lower bench. The objective of the additional characterization efforts at SS10 is to determine the extent of PCP contamination above ecological screening criteria.

Section 2.1 describes source area SS10. A discussion of PCP detections follows. Plate 1 shows the 1994 SS10 sample locations and analytical results. Again, the southernmost upper bench sample (SD01-SW07) and the northernmost lower bench sample (SD01-SW04) both exceed the AWQC for acute and chronic exposure scenarios for PCP. Concentrations measured in these samples were 53 μg/L and 230 μg/L, respectively. The AWQC chronic exposure limit is 13 μg/L and the acute limit is 20 μg/L for PCP in surface water. Two seep samples collected from the western

slope of the mountain contained PCP at 7.0 and 8.6 μg/L. PCP was also detected in test pit soil and water samples. These detections are not of concern because they are in the subsurface and complete pathways to ecological receptors do not exist. These test pits were excavated at locations upgradient (south) of the high measurement, 230 μg/L, at SS10-SW04, and probably share the same source.

A site reconnaissance of potential SS10-affected seeps and surface water drainages will be performed during construction of the diversion ditch. The area downgradient of location SS10-SW04 will be emphasized (Plate 1). Sediment was collected from a downgradient drainage in 1994. Surface water was not present at the time. Selected surface water locations will be sampled for PCP test kit analysis. PCP test kit detection limits will be 10 and 50 μg/L. These data will be used to select locations for laboratory samples. Where test kit data indicate the presence of PCP contamination greater than 10 μg/L, a sample will also be sent to the laboratory for quantification.

Samples proposed to further characterize the presence and extent of PCP contamination at SS10 are eight PCP test kit samples. The method of analysis is EPA Method 4010. PCP test kit information is included in Appendix B. It is estimated that three surface water samples will be collected at SS10 for fixed laboratory analysis. The laboratory analysis will be for PCP only. As previously mentioned, PCP detections in surface water during 1994 sampling were in excess of AWQC. The concentrations detected in the water samples SD01-SW07 and SS10-SW04 have been shown to pose an ecological risk to avian species. Therefore, test kit analysis will be used to field verify the presence and concentration of these and other seep locations. Where PCP is detected by test kit analysis at concentrations of 10 μg/L or greater, fencing will be used to restrict contact of avian species to the seeps. At this time, the number of seeps that may be fenced is unknown. The fencing of contaminated seeps will be accomplished by placing 1/4 inch steel mesh chain-link material over the seep. Discussions with wildlife professionals suggest the use of chicken-wire because it is reasonably weather-resistant, inexpensive, and is not expected to trap any bird or

mammal species. The fencing material will be secured by placing large boulders or stakes along its perimeter. Table 4.1-1 provides a summary of test kit and fixed laboratory analyses. Quality assurance samples are not included in the table. A duplicate surface-water sample will be submitted for PCP analysis.

4.2 SOURCE AREA OT08

PCBs are commonly associated with electrical transformers and capacitors. They are resistant to weathering and do not dissolve in water. Source area OT08 is a former radar facility that housed electrical equipment. PCBs were measured above Toxic Substances Control Act (TSCA) cleanup levels in surface and subsurface soil at OT08 during the 1994 RI. A shovel was used to collect samples in 1994 and therefore the depth of contamination was not determined. The objective for the 1995 investigation is to collect surface and subsurface soils, analyze the samples by immunoassay test kit and laboratory analyses, and define the volume of soil contaminated with PCBs above applicable risk levels.

TABLE 4.1-1
Summary of Analyses for
Additional Characterization Tasks

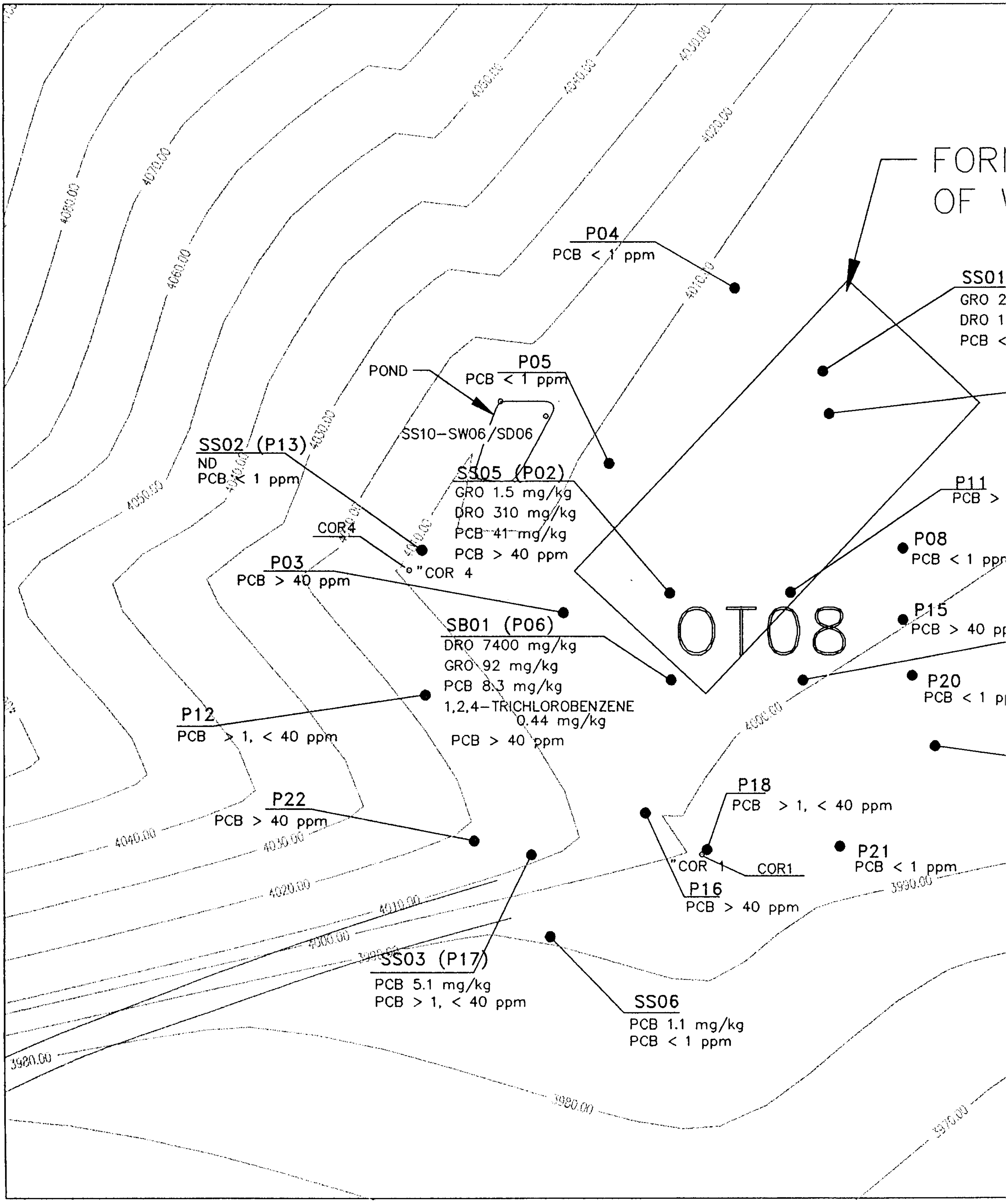
Location	Number of Samples	Media	Laboratory Analyses	Test Kit Analyses
SS10	3 lab 8 test kit	water water	PCP	PCP detection limits of 10 and 40 µg/L
OT08	11 lab 28 test kit	soil soil	8 PCB samples and 3 geotechnical	PCB detection limits of 10 and 40 mg/kg
SS02	4 lab	soil	VOC, SVOC, GRO, DRO	None
SS11	5 lab 12 test kit	soil	3 VOC and SVOC, 5 GRO and DRO	TPH detection limits of 50 and 200 mg/kg (GRO)
SS09	5 lab	water	VOC, GRO, DRO	None

Notes:
PCP = pentachlorophenol
PCB = polychlorinated biphenyls
TPH = total petroleum hydrocarbons
VOC = volatile organic compounds
SVOC = semivolatile organic compounds
GRO = gasoline range organics
DRO = diesel range organics

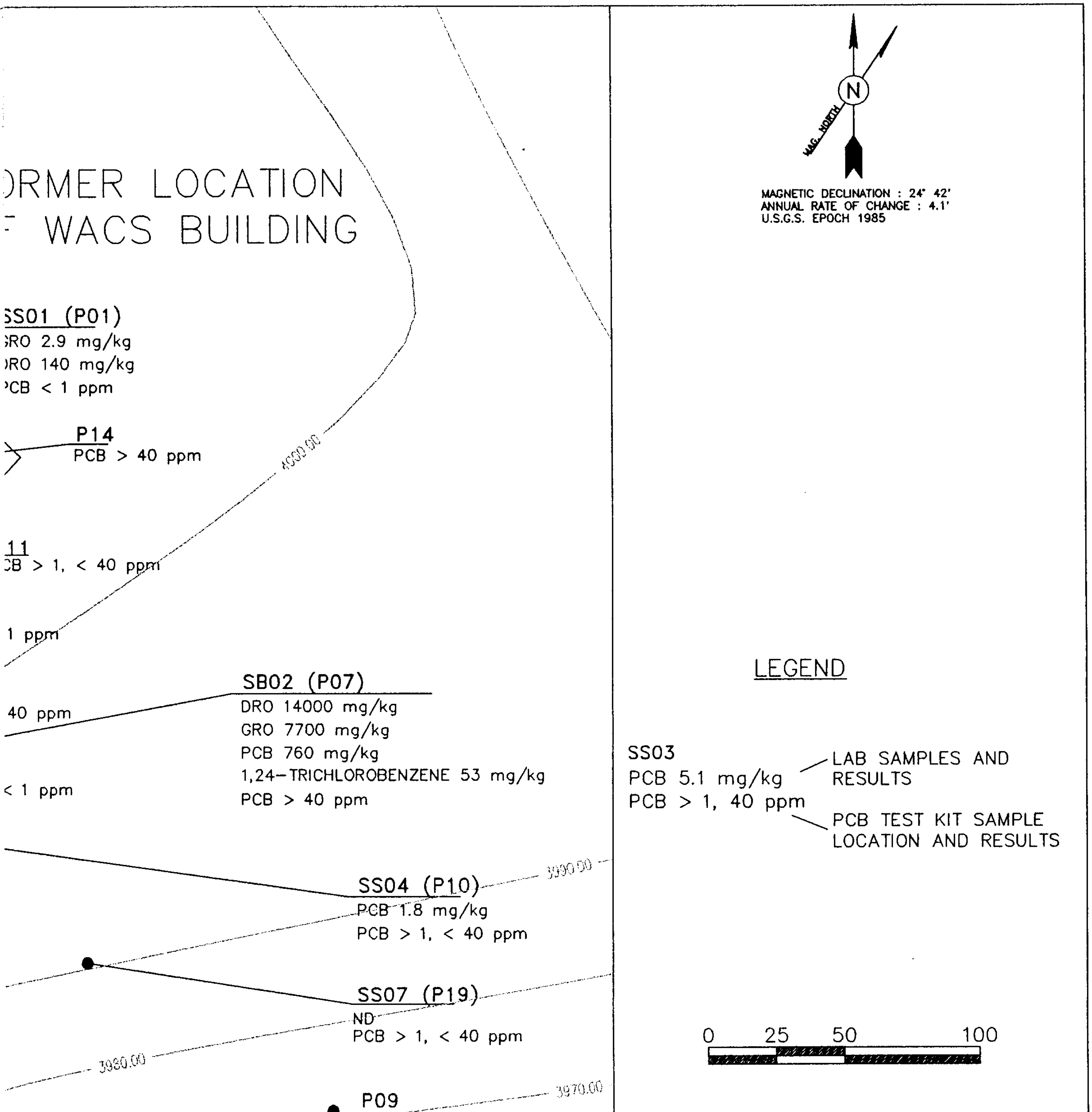
At OT08, PCB was detected using test kits and laboratory analysis at concentrations exceeding the Toxic Substances Control Act (TSCA) cleanup level of 10 ppm (or mg/kg). PCB was detected at concentrations ranging from non-detect (below detection limits) to as high as 760 mg/kg in one shallow subsurface soil location. The general area of surface soil contamination was identified but additional sampling is required to determine the vertical extent of contamination and the volume of soils affected.

At OT08, the locations of 1994 samples (Figure 4.2-1) were not permanently marked and will therefore be verified using maps and survey information. Surface soil and subsurface soil samples will be collected at those areas with detections above 40 ppm in 1994. A shovel or backhoe will be used to collect subsurface soil samples. Samples will be collected from undisturbed soil within the shovel or backhoe excavations, or material removed from excavations. Attempts will be made to collect samples at the soil/bedrock contact which is expected to be 5 to 10 feet below ground surface. Eight surface soil and 20 subsurface soil samples are currently planned. Immunoassay test kits designed for PCBs (EPA Method 4020) will be used for sample analysis. At least two of these samples will be duplicate samples. Up to eight samples will be sent to the laboratory for confirmation of test kit results. The lab samples will be collected from soils where high-, low-, and non-detects were measured with the test kits. Three samples will be collected from OT08 for geotechnical analysis. These data will be useful for remedial design considerations. Parameters of interest include: soil classification, bulk density, porosity, cation-exchange capacity, particle size analysis and distribution, percent moisture, and organic content.

PCB test kit information is included in Appendix B. Table 4.1-1 provides a summary of test kit and laboratory analyses. Sample locations will be marked with a labeled, permanent stake to ensure that the locations can be identified during future site visits. Locations will be tied into the COR1 and COR4 markers at the southern end of the source area (Figure 4.2-1) using a Brunton compass and a 200-foot tape. The COR markers are embedded in concrete and were surveyed by the 611 CES surveyor in 1994.



FOR
OF
P04
PCB < 1 ppm
SS01
GRO 2
DRO 1
PCB <
P05
PCB < 1 ppm
POND
SS10-SW06/SD06
SS02 (P13)
ND
PCB < 1 ppm
SS05 (P02)
GRO 1.5 mg/kg
DRO 310 mg/kg
PCB 41 mg/kg
PCB > 40 ppm
COR4
"COR 4
P03
PCB > 40 ppm
P11
PCB >
P08
PCB < 1 ppm
P15
PCB > 40 pp
OT08
SB01 (P06)
DRO 7400 mg/kg
GRO 92 mg/kg
PCB 8.3 mg/kg
1,2,4-TRICHLOROBENZENE
0.44 mg/kg
PCB > 40 ppm
P20
PCB < 1 p
P12
PCB > 1, < 40 ppm
P22
PCB > 40 ppm
P18
PCB > 1, < 40 ppm
"COR 1
COR1
P21
PCB < 1 ppm
P16
PCB > 40 ppm
SS03 (P17)
PCB 5.1 mg/kg
PCB > 1, < 40 ppm
SS06
PCB 1.1 mg/kg
PCB < 1 ppm
4080.00
4070.00
4060.00
4050.00
4040.00
4030.00
4020.00
4010.00
4000.00
3990.00
3980.00
3970.00



INDIAN MOUNTAIN
LONG RANGE RADAR STATION

OT08
LABORATORY AND FIELD
SCREENING LOCATIONS
AND RESULTS

PROJ. MGR.	ACAD FILE NO.	FIGURE NO.	
R.HENRY	42-1	4.2-1	
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HUNTER	05-G-46200		6/9/95

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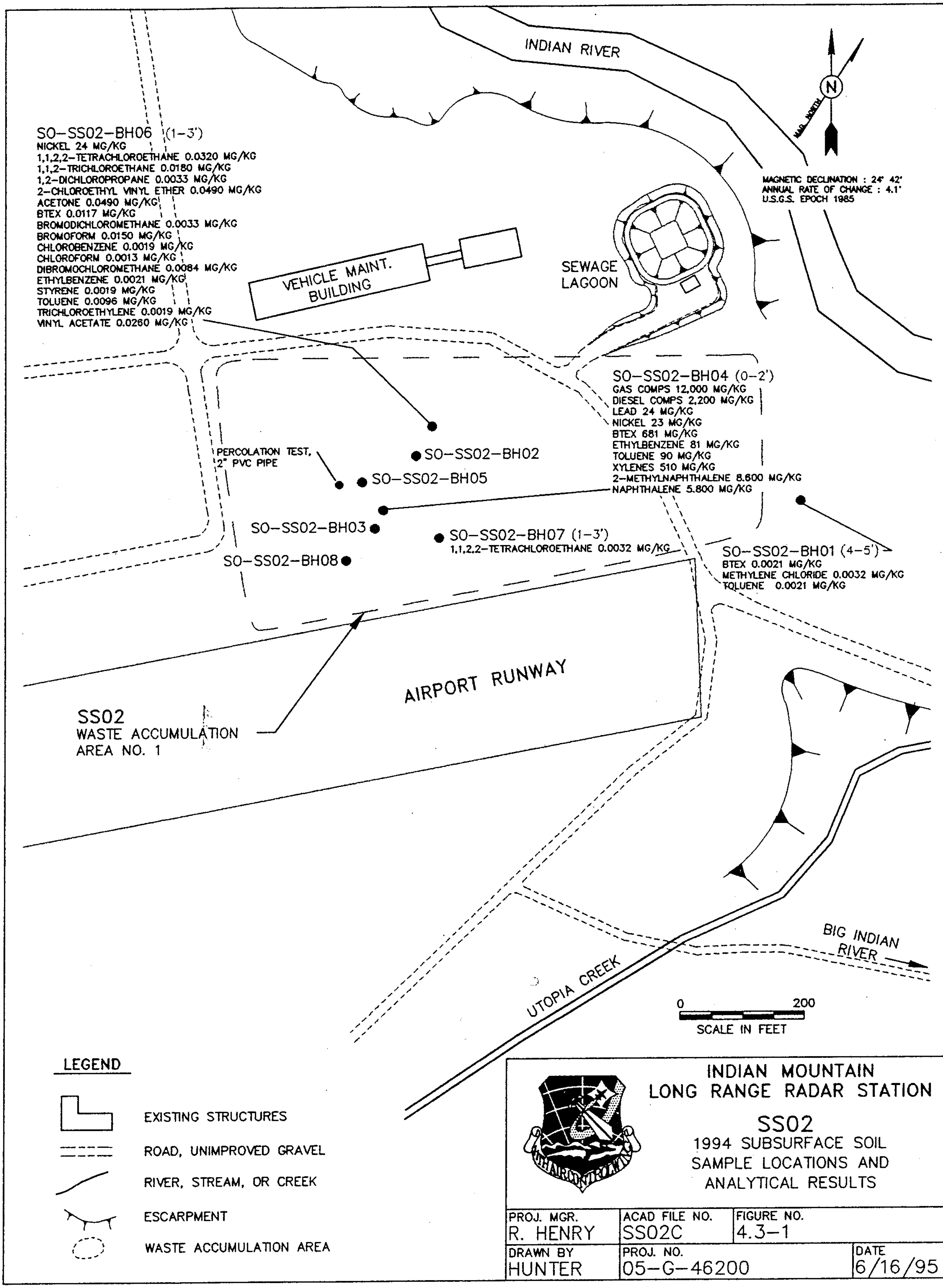
4.3 SOURCE AREA SS02

Additional sampling is proposed for SS02 to collect surface soil samples for risk evaluation. Surface soil samples were not collected from SS02 during the 1994 RI. Human health and ecological risk evaluations performed for the RI/FS were based on shallow subsurface soil samples. Because some of these samples contained volatile organic compounds above human health risk levels, and because site personnel frequently work in the vicinity of SS02, this source area was moved into the FS and remedial alternatives were developed and analyzed. Subsurface soil results and sample locations are shown in Figure 4.3-1.

The objective of the SS02 sampling proposed for 1995 is to determine the nature and extent of surface soil contamination at the site to more accurately assess human and ecological risk. Four surface soil samples collected for fixed laboratory analysis of VOC, SVOC, GRO, and DRO concentrations are planned for this source area. Proposed SS02 sampling and analysis is summarized in Table 4.1-1. Laboratory samples will be collected by methods described in the Indian Mountain LRRS Sampling and Analysis Plan (Air Force 1994b). Locations will be field determined based on a review of soil gas and subsurface soil results from 1994, and field-truthing during the 1995 effort. Sample locations will be marked with labeled, permanent stakes and surveyed using a compass and tape.

4.4 SOURCE AREA SS11

Surface soil or sediment sampling is proposed for SS11 to determine the extent of fuel and fuel-related compounds in the vicinity of the sediment sample collected in a small


INDIAN RIVER
N
MAG. NORTH
MAGNETIC DECLINATION : 24° 42'
ANNUAL RATE OF CHANGE : 4.1'
U.S.G.S. EPOCH 1985
SO-SS02-BH06 (1-3')
NICKEL 24 MG/KG
1,1,2,2-TETRACHLOROETHANE 0.0320 MG/KG
1,1,2-TRICHLOROETHANE 0.0180 MG/KG
1,2-DICHLOROPROPANE 0.0033 MG/KG
2-CHLOROETHYL VINYL ETHER 0.0490 MG/KG
ACETONE 0.0490 MG/KG
BTEX 0.0117 MG/KG
BROMODICHLOROMETHANE 0.0033 MG/KG
BROMOFORM 0.0150 MG/KG
CHLOROBENZENE 0.0019 MG/KG
CHLOROFORM 0.0013 MG/KG
DIBROMOCHLOROMETHANE 0.0084 MG/KG
ETHYLBENZENE 0.0021 MG/KG
STYRENE 0.0019 MG/KG
TOLUENE 0.0096 MG/KG
TRICHLOROETHYLENE 0.0019 MG/KG
VINYL ACETATE 0.0260 MG/KG
VEHICLE MAINT. BUILDING
SEWAGE LAGOON
SO-SS02-BH04 (0-2')
GAS COMPS 12,000 MG/KG
DIESEL COMPS 2,200 MG/KG
LEAD 24 MG/KG
NICKEL 23 MG/KG
BTEX 681 MG/KG
ETHYLBENZENE 81 MG/KG
TOLUENE 90 MG/KG
XYLENES 510 MG/KG
2-METHYLNAPHTHALENE 8.600 MG/KG
NAPHTHALENE 5.800 MG/KG
PERCOLATION TEST, 2" PVC PIPE
SO-SS02-BH02
SO-SS02-BH05
SO-SS02-BH03
SO-SS02-BH07 (1-3')
1,1,2,2-TETRACHLOROETHANE 0.0032 MG/KG
SO-SS02-BH08
SO-SS02-BH01 (4-5')
BTEX 0.0021 MG/KG
METHYLENE CHLORIDE 0.0032 MG/KG
TOLUENE 0.0021 MG/KG
AIRPORT RUNWAY
SS02
WASTE ACCUMULATION AREA NO. 1
BIG INDIAN RIVER
UTOPIA CREEK
0
200
SCALE IN FEET
LEGEND
EXISTING STRUCTURES
ROAD, UNIMPROVED GRAVEL
RIVER, STREAM, OR CREEK
ESCARPMENT
WASTE ACCUMULATION AREA
INDIAN MOUNTAIN LONG RANGE RADAR STATION
SS02
1994 SUBSURFACE SOIL SAMPLE LOCATIONS AND ANALYTICAL RESULTS
PROJ. MGR.
R. HENRY
ACAD FILE NO.
SS02C
FIGURE NO.
4.3-1
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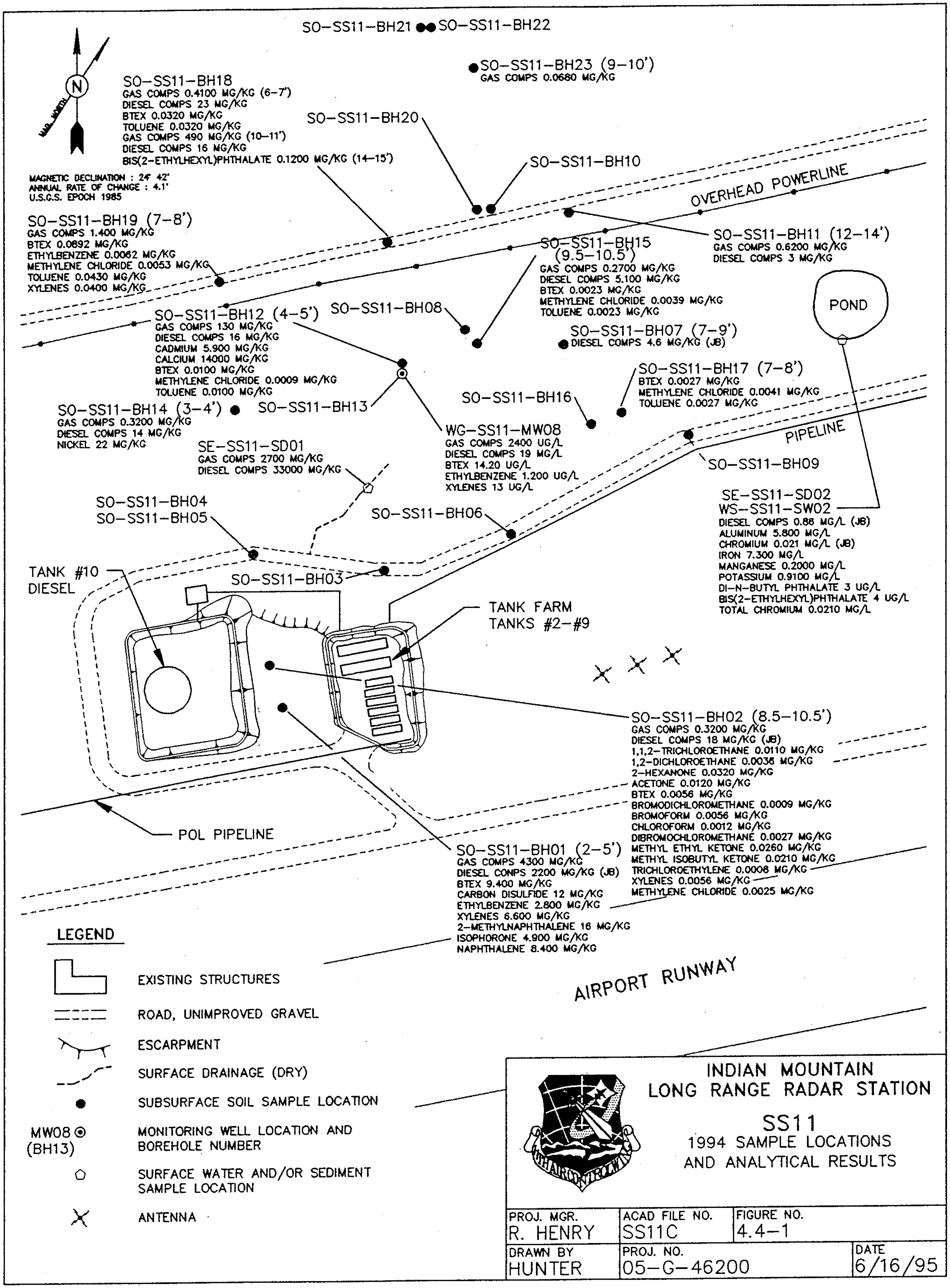
HUNTER
PROJ. NO.
05-G-46200
DATE
6/16/95

drainage in 1994. This area is depicted in Figure 4.4-1. A single sediment sample was collected from a small, dry drainage on the northeast side of the tank farm in 1994. Results indicated high levels of DRO and GRO and limited concentrations of VOCs. The objectives for proposed sampling at SS11 are to collect samples to characterize fuel contamination in surface soil and sediment near the 1994 sediment sample, and to collect sufficient data for risk evaluation.

The sampling approach for SS11 is to collect 12 surface soil samples for TPH test kit analysis at detection levels of 50 and 200 mg/kg GRO. These levels correspond to 75 and 330 mg/kg DRO. The locations of test kit samples will be determined in the field, based on visual observations of drainage patterns, stressed vegetation, and photoionization detector measurements. The test kit data will be used to select locations for samples to be sent to the laboratory for analysis. Five samples will submitted for GRO and DRO analysis. Three of these samples will also be analyzed for VOCs and SVOCs for risk evaluation purposes. Quality assurance and control samples are not included in this table. An equipment rinsate sample will be collected from either SS02 or SS11 sampling equipment. Laboratory samples will be collected by methods described in the Indian Mountain LRRS Sampling and Analysis Plan (Air Force 1994b). Laboratory sample locations will be marked with permanent stakes. These locations, as well as the test kit locations, will be surveyed using a compass and tape.

4.5 SOURCE AREA SS09

Four monitoring wells were installed and sampled at SS09 in 1994. Samples collected from these wells contained GRO, DRO, VOCs, and SVOCs. Because there is some



SO-SS11-BH21
SO-SS11-BH22
SO-SS11-BH23 (9-10')
GAS COMPS 0.0680 MG/KG
SO-SS11-BH18
GAS COMPS 0.4100 MG/KG (6-7')
DIESEL COMPS 23 MG/KG
BTEX 0.0320 MG/KG
TOLUENE 0.0320 MG/KG
GAS COMPS 490 MG/KG (10-11')
DIESEL COMPS 16 MG/KG
BIS(2-ETHYLHEXYL)PHTHALATE 0.1200 MG/KG (14-15')
SO-SS11-BH20
SO-SS11-BH10
MAGNETIC DECLINATION : 24° 42'
ANNUAL RATE OF CHANGE : 4.1'
U.S.G.S. EPOCH 1985
OVERHEAD POWERLINE
SO-SS11-BH19 (7-8')
GAS COMPS 1.400 MG/KG
BTEX 0.0892 MG/KG
ETHYLBENZENE 0.0062 MG/KG
METHYLENE CHLORIDE 0.0053 MG/KG
TOLUENE 0.0430 MG/KG
XYLENES 0.0400 MG/KG
SO-SS11-BH15
(9.5-10.5')
GAS COMPS 0.2700 MG/KG
DIESEL COMPS 5.100 MG/KG
BTEX 0.0023 MG/KG
METHYLENE CHLORIDE 0.0039 MG/KG
TOLUENE 0.0023 MG/KG
SO-SS11-BH11 (12-14')
GAS COMPS 0.6200 MG/KG
DIESEL COMPS 3 MG/KG
POND
SO-SS11-BH12 (4-5')
GAS COMPS 130 MG/KG
DIESEL COMPS 16 MG/KG
CADMIUM 5.900 MG/KG
CALCIUM 14000 MG/KG
BTEX 0.0100 MG/KG
METHYLENE CHLORIDE 0.0009 MG/KG
TOLUENE 0.0100 MG/KG
SO-SS11-BH08
SO-SS11-BH07 (7-9')
DIESEL COMPS 4.6 MG/KG (JB)
SO-SS11-BH17 (7-8')
BTEX 0.0027 MG/KG
METHYLENE CHLORIDE 0.0041 MG/KG
TOLUENE 0.0027 MG/KG
SO-SS11-BH14 (3-4')
GAS COMPS 0.3200 MG/KG
DIESEL COMPS 14 MG/KG
NICKEL 22 MG/KG
SO-SS11-BH13
SO-SS11-BH16
WG-SS11-MW08
GAS COMPS 2400 UG/L
DIESEL COMPS 19 MG/L
BTEX 14.20 UG/L
ETHYLBENZENE 1.200 UG/L
XYLENES 13 UG/L
PIPELINE
SE-SS11-SD01
GAS COMPS 2700 MG/KG
DIESEL COMPS 33000 MG/KG
SO-SS11-BH09
SE-SS11-SD02
WS-SS11-SW02
DIESEL COMPS 0.86 MG/L (JB)
ALUMINUM 5.800 MG/L
CHROMIUM 0.021 MG/L (JB)
IRON 7.300 MG/L
MANGANESE 0.2000 MG/L
POTASSIUM 0.9100 MG/L
DI-N-BUTYL PHTHALATE 3 UG/L
BIS(2-ETHYLHEXYL)PHTHALATE 4 UG/L
TOTAL CHROMIUM 0.0210 MG/L
SO-SS11-BH04
SO-SS11-BH05
SO-SS11-BH06
TANK #10
DIESEL
SO-SS11-BH03
TANK FARM
TANKS #2-#9
SO-SS11-BH02 (8.5-10.5')
GAS COMPS 0.3200 MG/KG
DIESEL COMPS 18 MG/KG (JB)
1,1,2-TRICHLOROETHANE 0.0110 MG/KG
1,2-DICHLOROETHANE 0.0036 MG/KG
2-HEXANONE 0.0320 MG/KG
ACETONE 0.0120 MG/KG
BTEX 0.0056 MG/KG
BROMODICHLOROMETHANE 0.0009 MG/KG
BROMOFORM 0.0056 MG/KG
CHLOROFORM 0.0012 MG/KG
DIBROMOCHLOROMETHANE 0.0027 MG/KG
METHYL ETHYL KETONE 0.0260 MG/KG
METHYL ISOBUTYL KETONE 0.0210 MG/KG
TRICHLOROETHYLENE 0.0008 MG/KG
XYLENES 0.0056 MG/KG
METHYLENE CHLORIDE 0.0025 MG/KG
POL PIPELINE
SO-SS11-BH01 (2-5')
GAS COMPS 4300 MG/KG
DIESEL CONPS 2200 MG/KG (JB)
BTEX 9.400 MG/KG
CARBON DISULFIDE 12 MG/KG
ETHYLBENZENE 2.800 MG/KG
XYLENES 6.600 MG/KG
2-METHYLNAPHTHALENE 16 MG/KG
ISOPHORONE 4.900 MG/KG
NAPHTHALENE 8.400 MG/KG
AIRPORT RUNWAY
LEGEND
EXISTING STRUCTURES
ROAD, UNIMPROVED GRAVEL
ESCARPMENT
SURFACE DRAINAGE (DRY)
SUBSURFACE SOIL SAMPLE LOCATION
MW08
(BH13)
MONITORING WELL LOCATION AND
BOREHOLE NUMBER
SURFACE WATER AND/OR SEDIMENT
SAMPLE LOCATION
ANTENNA
INDIAN MOUNTAIN
LONG RANGE RADAR STATION
SS11
1994 SAMPLE LOCATIONS
AND ANALYTICAL RESULTS
PROJ. MGR.
R. HENRY
ACAD FILE NO.
SS11C
FIGURE NO.
4.4-1
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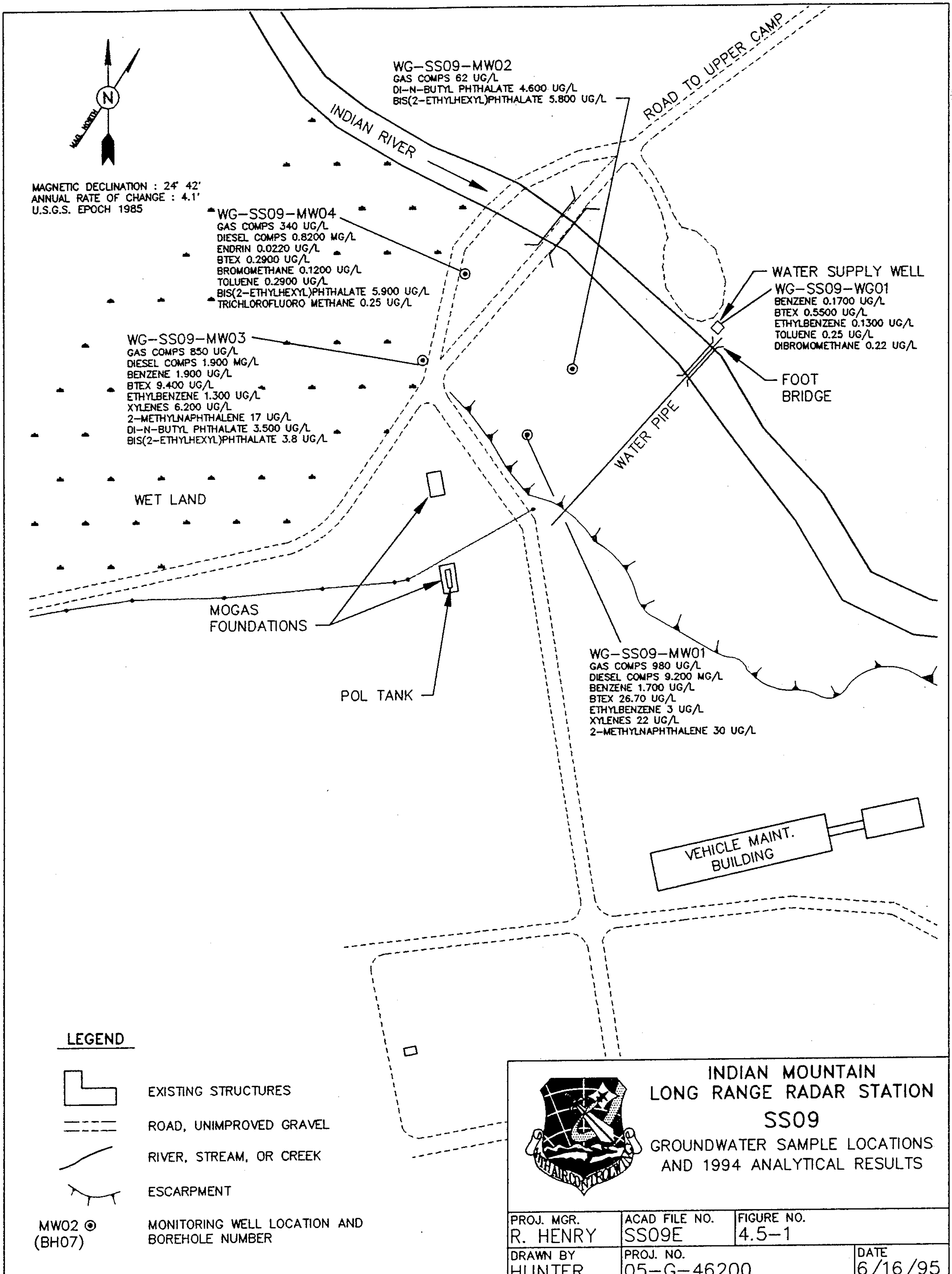
05-G-46200
DATE
6/16/95

potential for SS09 contaminants to reach the drinking water supply well located across the Indian River from SS09, resampling of the SS09 wells is considered necessary. Benzene was measured in a 1994 sample collected from the water supply well although the concentration was below all applicable risk levels. All wells are shown in Figure 4.5-1.

All four of the SS09 monitoring wells and the drinking water supply well will be sampled to assess presence of contaminants, further characterize source area SS09, ascertain the variability of contaminant concentrations between 1994 and 1995, and determine if SS09 contaminants have migrated to the water supply well. The groundwater samples will be submitted to the laboratory for VOC, GRO, and DRO analysis. Quality control samples are not included in this table. A duplicate sample will be collected from one of the wells. A sampling and analysis summary is provided in Table 4.1-1.

Up to three purge volumes will be removed from the monitoring wells before sampling. Because recovery may be slow in some wells, it may be necessary to collect samples after a well is purged dry and water recovery is sufficient to fill a sample container. Groundwater will be sampled by methods described in the Indian Mountain RI/FS Sampling and Analysis Plan (Air Force 1994b).

In addition to sampling the wells for contaminant concentrations, data collection will be conducted to assess the effect of the Indian River on well water levels. Water levels will be measured in the river and wells after rain events. Levels will be measured daily if possible.



N
MAG. NORTH
MAGNETIC DECLINATION : 24° 42'
ANNUAL RATE OF CHANGE : 4.1'
U.S.G.S. EPOCH 1985
INDIAN RIVER
ROAD TO UPPER CAMP
WG-SS09-MW02
GAS COMPS 62 UG/L
DI-N-BUTYL PHTHALATE 4.600 UG/L
BIS(2-ETHYLHEXYL)PHTHALATE 5.800 UG/L
WG-SS09-MW04
GAS COMPS 340 UG/L
DIESEL COMPS 0.8200 MG/L
ENDRIN 0.0220 UG/L
BTEX 0.2900 UG/L
BROMOMETHANE 0.1200 UG/L
TOLUENE 0.2900 UG/L
BIS(2-ETHYLHEXYL)PHTHALATE 5.900 UG/L
TRICHLOROFLUORO METHANE 0.25 UG/L
WG-SS09-MW03
GAS COMPS 850 UG/L
DIESEL COMPS 1.900 MG/L
BENZENE 1.900 UG/L
BTEX 9.400 UG/L
ETHYLBENZENE 1.300 UG/L
XYLENES 6.200 UG/L
2-METHYLNAPHTHALENE 17 UG/L
DI-N-BUTYL PHTHALATE 3.500 UG/L
BIS(2-ETHYLHEXYL)PHTHALATE 3.8 UG/L
WATER SUPPLY WELL
WG-SS09-WG01
BENZENE 0.1700 UG/L
BTEX 0.5500 UG/L
ETHYLBENZENE 0.1300 UG/L
TOLUENE 0.25 UG/L
DIBROMOMETHANE 0.22 UG/L
FOOT BRIDGE
WATER PIPE
WET LAND
MOGAS FOUNDATIONS
POL TANK
WG-SS09-MW01
GAS COMPS 980 UG/L
DIESEL COMPS 9.200 MG/L
BENZENE 1.700 UG/L
BTEX 26.70 UG/L
ETHYLBENZENE 3 UG/L
XYLENES 22 UG/L
2-METHYLNAPHTHALENE 30 UG/L
VEHICLE MAINT. BUILDING
LEGEND
EXISTING STRUCTURES
ROAD, UNIMPROVED GRAVEL
RIVER, STREAM, OR CREEK
ESCARPMENT
MW02 (BH07)
MONITORING WELL LOCATION AND BOREHOLE NUMBER
INDIAN MOUNTAIN
LONG RANGE RADAR STATION
SS09
GROUNDWATER SAMPLE LOCATIONS AND 1994 ANALYTICAL RESULTS
PROJ. MGR. R. HENRY
ACAD FILE NO. SS09E
FIGURE NO. 4.5-1
DRAWN BY HUNTER
PROJ. NO. 05-G-46200
DATE 6/16/95

5.0 EQUIPMENT DECONTAMINATION AND WASTE MANAGEMENT

The following sections describe procedures pertaining to field equipment decontamination and investigation-derived waste management.

5.1 EQUIPMENT DECONTAMINATION

Equipment decontamination will follow procedures described in the Indian Mountain LRRS RI/FS Sampling and Analysis Plan (Air Force 1994b). A water treatment unit will be constructed to treat purge water generated during well sampling. This unit is described in the next section. Because a limited quantity of water will be generated, the water treatment unit will not be used for heavy equipment decontamination water treatment. Decontamination water generated when cleaning sampling equipment will be contained and treated with the carbon filtration system.

All sampling equipment will be decontaminated by following the procedures described in the RI/FS Sampling and Analysis Plan (Air Force 1994).

Solvent rinse residue resulting from sampling equipment decontamination will be collected and put in the drum containing solvent waste generated during 1994 RI activities.

Heavy equipment used to excavate test pits, the diversion ditch, and containment unit will be decontaminated onsite before changing tasks. For example, if a backhoe is used to excavate test pits at OT08, it will be decontaminated onsite using a high pressure washer containing a soap solution. Wash water will not be collected but will be allowed to flow into surface soils within the source area boundary. At the soils containment unit, decontamination will be conducted over the containment unit and water allowed to flow into IDW soils. The added moisture is necessary for biodegradation of petroleum hydrocarbons and a biodegradable soap (Simple Green) will have minimal effect on constituents in the soil pile. Again, efforts will be made to limit the volume of wastewater generated. The soap solution will be followed by a potable water rinse. No Type II water or solvent rinse will be performed on heavy equipment.

5.2 WASTE MANAGEMENT

Waste management procedures described in the Indian Mountain LRRS RI/FS Sampling and Analysis Plan (Air Force 1994b) will be followed during 1995 investigations except as noted below:

- Decontamination water from heavy equipment will not be collected but will be allowed to seep into soils at the source area where excavation tasks were performed. A biodegradable soap solution will be used.

- No IDW soils will be containerized and stored at the site. Soils remaining after backfilling excavations will be spread on the ground or placed in the IDW soils containment unit. This decision will be based on PID readings or TPH field test kits.

A granular activated carbon water treatment system will be assembled to treat decontamination water and well purge water. This system will be identical to the system used in 1994 and described in the RI/FS Sampling and Analysis Plan (Air Force 1994b).

6.0 PROJECT ORGANIZATION AND SCHEDULE

This section presents the key project personnel and schedule for conducting the project tasks.

6.1 PROJECT ORGANIZATION

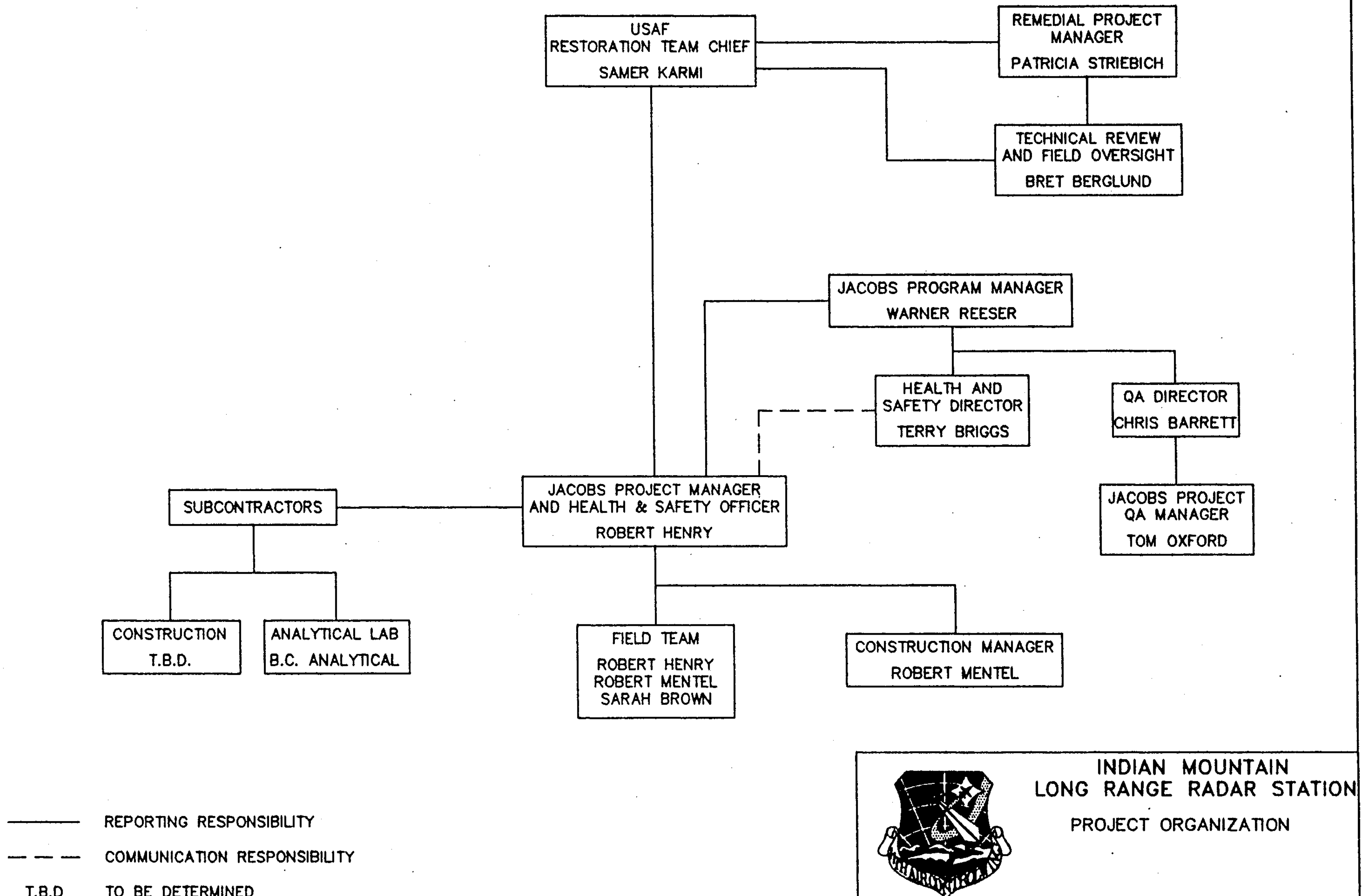
The proposed project organization is depicted in Figure 6.1-1. Figure 6.1-1 describes the working relationship between the Restoration Team Chief, Remedial Project Manager, and Contractor Project Manager, as well as the interrelationships between contractor staff and support subcontractors.

The contractor will assume overall responsibility for all QA activities and functions, monitor the performance of select subcontractors, and conduct all field sampling and construction.

Key project personnel and their responsibilities with respect to QA functions are briefly described below.

- Samer Karmi - Restoration Team Chief. Responsible for project oversight, including review and approval of all project deliverables (telephone: 210-536-5297).
- Patricia Striebich - Remedial Project Manager. Responsible for review and approval of all project deliverables (telephone: 907-552-4542).
- Robert Henry - Contractor Project Manager and Field Operations Leader. Responsible for coordinating and directing the technical efforts of the project staff and subcontractors in conducting the IRA and containment cell construction. Provides instruction to all personnel to ensure that field data and samples are collected in accordance with project QA/QC requirements specified in the SAP which further enables preparation and delivery of documents that meet the project QA requirements (telephone: 303-595-8855).

Subcontractor services will be used during construction of the diversion ditch and the containment cell. Subcontractor services will also be used to perform laboratory analyses.



INDIAN MOUNTAIN
LONG RANGE RADAR STATION

PROJECT ORGANIZATION

PROJ. MGR.	ACAD FILE NO.	FIGURE NO.	
R. HENRY	FLOW	6.1-1	
DRAWN BY	PROJ. NO.		DATE
HUNTER	05-G-46200		5/10/95

The subcontractor laboratory selected to perform the work is B.C. Analytical of Glendale, California. B.C. Analytical provided analytical services for the conduct of the RI field work at Indian Mountain in 1994. The laboratory will provide complete analytical data packages equivalent to IRP Level 2 data.

Specific details regarding subcontract laboratory organization, QA procedures, and analytical methodologies were included in the Laboratory Quality Assurance Project Plan (QAPP), an appendix to the RI/FS SAP (Air Force 1994b). The analytical laboratory will assume full responsibility for QA of all laboratory analyses performed. The laboratory subcontractor has identified the following personnel for the project:

- Linda Geddes - Laboratory Project Manager; and
- Steve Valentini - Laboratory Quality Assurance Manager.

The functions related to the excavation and construction of the diversion ditch and the construction of the containment cell will be subcontracted to an environmental construction company. The construction subcontractor will be selected at a later date.

6.2 PROJECT SCHEDULE

The schedule for constructing the diversion ditch and containment cell, SS10 PCP characterization, OT08 PCB characterization, sampling activities at SS02, SS11 and SS09, laboratory analyses, and reporting is presented in Table 6.2-1.

TABLE 6.2-1
Work Plan Addendum Proposed Schedule
Indian Mountain Long Range Radar Station, Alaska

ACTIVITY	DATE
ADMINISTRATIVE	
Prepare Ditch/Containment Cell SOW	14 June 1995
Distribute Ditch/Containment Cell SOW	June 1995
Review Ditch/Containment Cell SOW responses	June 1995
Award Ditch/Containment Cell subcontract	July 1995
DIVERSION DITCH	
Mobilize Jacobs and subcontractor personnel to IMLRRS (for all activities)	7 August 1995
Excavate ditch	9 August 1995
Install liner	10 August 1995
Backfill ditch and install sampling port	11 August 1995
Sample and data collection	12 August 1995
ADDITIONAL CHARACTERIZATION SS10	
Perform site reconnaissance	11 August 1995
Perform field analysis	12 August 1995
Review field analytical results	13 August 1995
ADDITIONAL CHARACTERIZATION OT08	
Collect test kit samples from test pits	14 August 1995
Collect test kit samples from test pits and mobilize backhoe to Lower camp	15 August 1995
ADDITIONAL CHARACTERIZATION SS02	
Collect surface soil samples	17 August 1995
ADDITIONAL CHARACTERIZATION SS11	
Collect and analyze test kit samples	16 August 1995
Collect laboratory samples	17 August 1995
ADDITIONAL CHARACTERIZATION SS09	
Collect groundwater samples	17 August 1995
CONTAINMENT CELL	
Sample uncharacterized drums	8 August 1995
Site preparation, construct berm wall	16 August 1995
Install liner, initial soil lift, and ventilation system	17 August 1995
Place remaining IDW	18 August 1995
Sample IDW, install and secure cover	19 August 1995
Demobilize Jacobs and subcontractor personnel	21 August 1995
REPORTS	
Prepare draft letter report	21 August 1995
Submit draft letter report	4 September 1995
Prepare draft treatability study report	21 August 1995
Submit draft treatability study report	6 October 1995
Submit final treatability study report	30 November 1995

Notes:

IDW = Investigation Derived Waste
IMLRSS = Indian Mountain Long Range Radar Station
SOW = Statement of Work

7.0 REPORTING

One letter report will be submitted to the contracting officer representative (COR) that presents field generated data including an evaluation of the data. A letter report will be submitted approximately two weeks after demobilization from the field.

The schedule for preparation and submission of the letter report and treatability study reports was included in Table 6.2-1.

A treatability study report will be submitted after completion of the IRA. The treatability study report will present a description of the construction and installation of the diversion ditch system, the containment cell, and as-built drawings for both. Also, an assessment of effectiveness of the diversion ditch system will be included. The report will also present the laboratory analytical results and test kit results and interpretation of the additional characterization at SS10, OT08, SS02, SS11, and SS09 and will present recommendations for future actions.

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8.0 REFERENCES

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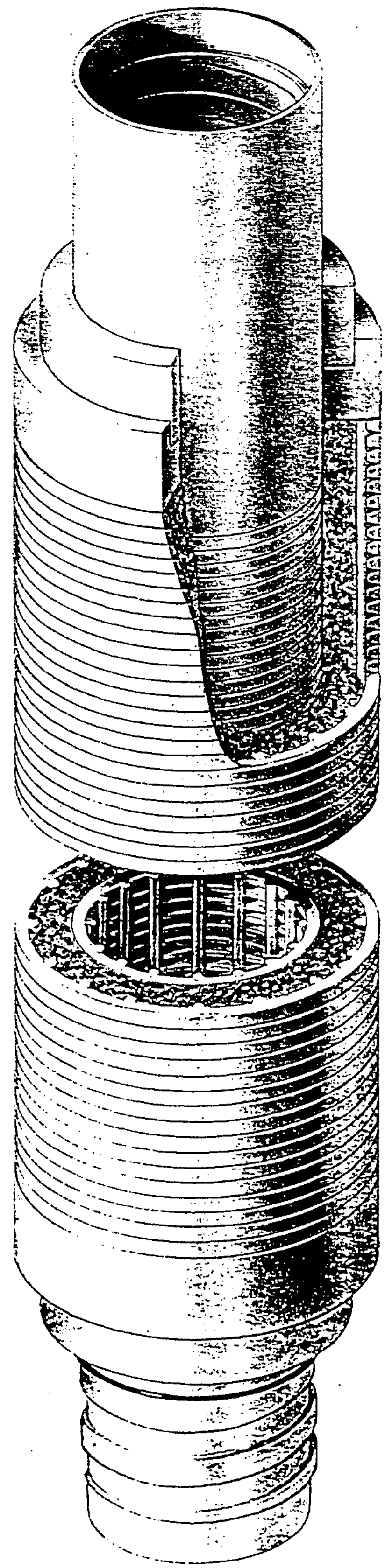
APPENDIX A

Manufacturer's Specifications

VEE-PACK™ PVC PRE-PACKED SCREENS

Typical Applications

- Recovery and monitoring wells involving:
  - -Heaving, caving sands.
  - -Silty, fine sand formations.
- Minimal borehole sizes:
  - -In known contaminated wells.
  - -For well depths to 300 feet.



Easy, Low Cost Installation

- Allows smaller borehole sizes, which reduce drilling costs.
- Eliminates time required to install a fine filter pack.
- Reduces cuttings disposal.
- Uses economical PVC materials.

Faster Well Development

- Offers about three times the open area compared to slotted pipe.
- Minimizes screen slot plugging and dry wells.
- Clears wells faster because there are no voids in the fine filter pack.

Representative Samples

- Provides clear, sediment-free samples.
- Permits water to enter at lower entrance velocities with reduced turbidity.
- Reduces sampling time.

Specifications for PVC Vee-Pack™

Pipe Size *(Inches)*	DIAMETER		Standard Length [b] *(Ft.)*	Open Area *(Sq. In./Ft.)* [c]			STRENGTH [d]		
	O.D. *(In.)*	I.D. [a] *(In.)*		40 x 60 Pack (8-Slot)	20 x 40 Pack (12-Slot)	10 x 20 Pack (20-Slot)	Collapse [c] *(PSI)*	Tensile [e] *(Lbs.)*	Hanging Wt. [f] *(Lbs.)*
2	3.63	2.00	2.5, 5, 10	6.1	8.9	14.0	250	1,100	425
4	5.67	4.00	2.5, 5, 10	9.3	13.8	21.7	150	1,600	525

a. Clear I.D.s are dimensions with fittings attached.
b. Lengths are measured shoulder-to-shoulder.
c. Open areas and collapse are based on inner screen.
d. Strength properties are established at 73° F.
e. Tensile is based on area of inner screen rods.
f. Hanging weight is maximum weight on the top screen.

Competitive Comparison

Pipe Size *(Inches)*	PVC PRE-PACKED PRODUCT	OPEN AREA†		
		40 x 60 Pack (8-Slot)	20 x 40 Pack (12-Slot)	10 x 20 Pack (20-Slot)
2	Vee-Pack	6.3%	9.1%	14.3%
	Slotted	1.8%	2.3%	5.8%
4	Vee-Pack	5.4%	7.9%	12.5%
	Slotted	1.9%	2.8%	4.5%

† Based on the open area of the inner screen - for slotted product, assumes slots at 1/4" nominal spacing.

Standard Features

- Vee-Wire® design for maximum open area and minimum plugging — a Johnson screens™ exclusive.
- Sonically-welded PVC support rods and V-shaped wire are thermally attached to fittings without the use of solvents — a Johnson screens™ exclusive.
- ASTM F480 flush threads with Buna-N O-rings provide leak-proof joints.
- Pre-packed with uniform, clean, re-sieved silica sand.
- Individually cleaned and hermetically sealed in a 7-mil protective bag to eliminate contaminants.

Product Options

- Custom-designed filter packs.
- Viton O-rings for special applications.
- Thread-on points for ease of installation in heaving sands.

APPENDIX B

Test Kit Information

PETRO RIS$\underline{C}$® Soil and Water Tests

EPA Method 4030

The PETRO RIS$\underline{C}$® Soil and Water Tests enable environmental professionals to obtain analytical results in the field at the time of sampling. The application of field methods reduces equipment, personnel and analytical costs and improves overall project quality.

The PETRO RIS$\underline{C}$® Soil and Water Tests are specific to compounds such as gasoline, diesel fuel and jet fuel with no sensitivity to potential interferents such as chlorinated solvents and MTBE.

Applications

Petrochemical Industry

- Delineation of groundwater contamination
- Siting of groundwater monitoring wells
- Monitoring the progress of on -site groundwater extraction and treatment remediation
- Routine groundwater monitoring
- Stormwater run-off testing
- Delineation of soil contamination at plant sites and off-site waste impounds
- Monitoring of land/farm treatment units

UST Removal and Remediation

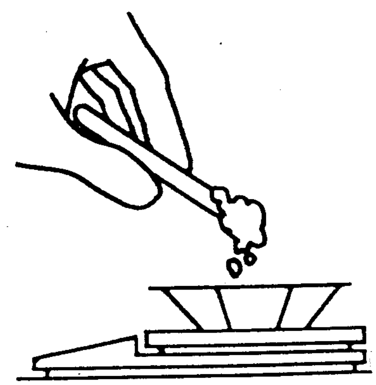
- Delineation of groundwater contamination
- Siting of groundwater monitoring wells
- Routine groundwater monitoring
- Monitoring the progress of soil remediation
- Guiding collection of samples for closure permitting
- Mapping of sites

PETRO RISC® Soil Test
Multiple and Single Level

Specific Product Characteristics

Minimum detection levels

Product	Minimum Detection Level (ppm)
Gasoline	10
Diesel fuel, #2	15
Jet A fuel	15
Jet fuel, JP-4	15
Kerosene	15
Fuel Oil, #2	15
Fuel Oil, #6	25
Mineral spirits	40



EPA Approval	**THE PETRO RISC® Soil Test has been approved for inclusion in the third update of Test Methods for Solid Waste, SW-846, under EPA Draft Method 4030.**
# of Analyses per kit	Multiple Level - Four Single Level - Five
Throughput Time	Four to five samples may be completed in less than 45 minutes.
Detection level	The detection levels can be adjusted to allow the user to test a contaminant concentration to suit the actual site action levels with the multiple level test.
Storage	Room temperature

PCB RIS^{c}® Soil and Wipe Tests

EPA Method 4020

The PCB RIS^{c}® Soil and Wipe Tests enable environmental professionals to obtain analytical results in the field at the time of sampling. The application of field methods reduces equipment personnel and analytical costs and improves overall project quality.

The PCB RIS^{c}® Soil and Wipe Tests are specific to polychlorinated biphenyls with little sensitivity to potential interferents such as chlorinated benzenes and phenols.

Applications

Utility and General Industry

- Emergency delineation of transformer contamination
- Delineation of equipment and building contamination
- Delineation of soil contamination at substations and plant sites
- Monitoring the progress of on-site and substation remediation

Natural Gas Pipeline Industry

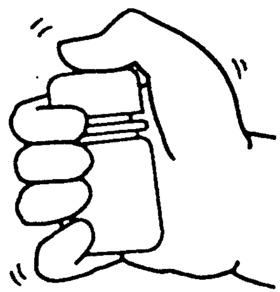
- Delineation of soil contamination at substations and plant sites
- Monitoring the progress of equipment decontamination
- Delineation of contamination at compressor station sites
- Delineation of soil contamination at off-site locations

PCB RIS$\underline{C}$® Soil Test

Specific Product Characteristics

Minimum detection levels

Aroclor	Minimum Detection Level (ppm)
1260	0.4
1254	0.4
1248	1
1242	2



EPA Approval	**The PCB RIS^{C}® Soil Test has been approved for inclusion in the third update of Test Methods for Solid Waste, SW-846, under EPA Draft Method 4020.**
# of Analyses per kit	Four
Throughput Time	Four samples may be completed in less than 45 minutes.
Detection level	The levels can be adjusted to allow the user to test a contaminant concentration to suit the actual site action levels. Two detection levels allow the user to obtain a semi-quantitative result.
Storage	Room temperature

PCP RIS$\underline{C}$® Soil and Water Tests

EPA Method 4010

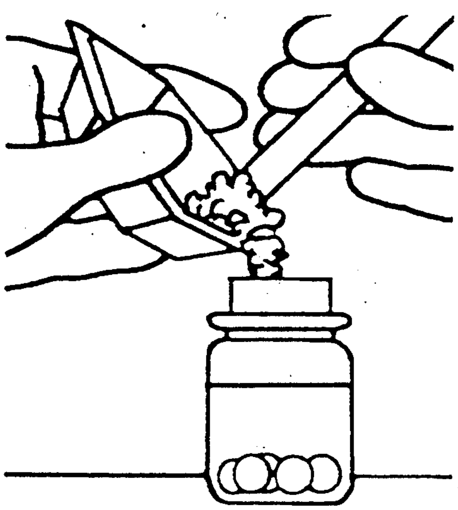
The PCP RIS$\underline{C}$® Soil and Water Tests enable environmental professionals to obtain analytical results in the field at the time of sampling. The application of field methods reduces equipment, personnel and analytical costs and improves overall project quality.

The PCP RIS$\underline{C}$® Soil and Water Tests are specific to pentachlorophenol with little sensitivity to potential interferents such as chlorinated benzenes, creosote, petroleum hydrocarbons, and chromated copper arsenate.

Application

Wood Preserving Industry

- Delineation of groundwater contamination
- Siting of groundwater monitoring wells
- Routine groundwater monitoring
- Stormwater run-off testing
- Guiding collection of samples for closure permitting
- Delineation of soil contamination at plant sites
- Monitoring the progress of soil remediation



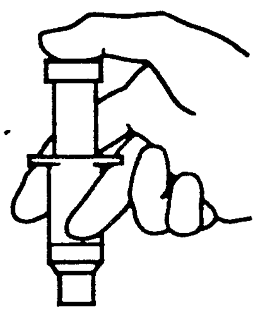
PCP RISc® Soil Test

Specific Product Characteristics

Minimum detection level

Pentachlorophenol - .5 ppm

EPA Approval	**The PCP RISc® Soil Test has been included in the second update of Test Methods for Solid Waste, SW-846, under EPA Method 4010.**
# of Analyses per kit	Four
Throughput Time	Four samples may be completed in less than 45 minutes.
Detection level	The levels can be adjusted to allow the user to test a contaminant concentration to suit the actual site action levels. Three detection levels allow the user to obtain a semi-quantitative result.
Storage	Room temperature



PCP RISc® Water Test

Specific Product Characteristics

Minimum detection level

Pentachlorophenol - 5 ppb

EPA Approval	**The PCP RISc® Water Test has been included in the second update of Test Methods for Solid Waste, SW-846, under EPA Method 4010.**
# of Analyses per kit	Four
Throughput Time	Four samples may be completed in less than 30 minutes.
Detection level	The PCP RISc® Water Test can be tested at multiple levels.
Storage	Refrigerate at 38°F